620.1

	Route to	See page
1		
2		
3		
4		
5		
6		

Contractors and Engineers Monthly

Vol. 46, No. 7 JULY, 1949 $3 a Year, 50 Cents a Copy

Covering the Field

- **Airport Improved**

As page 1 relates, things have been buzzing in a construction way at a northeastern field, a port of entry to Canada.

- **Building Construction**

Speedy excavation and concrete form-panel work mark the first construction stage of a new bank building (page 1).

Business as usual at Jordan Marsh—though the store is being rebuilt on its original site a unit at a time (page 18).

Maintenance has been cut to a minimum in vacation quarters which a mill built for employees. See page 65.

- **Dirt Records on Dam Soar**

Between October, 1948, and March, 1949, nearly 4,000,000 cubic yards of earth fill was moved at Davis Dam. See page 2.

- **Concrete Floodwall**

A cantilever-type concrete floodwall, with a heel key to provide a water cut-off and resistance against sliding, is being built in W. Va. Article on page 5.

- **Bituminous Paving**

How Ohio improved 10 miles of road by widening and hot-mix surfacing—page 26.

How Massachusetts resurfaced 77 miles with bituminous concrete—page 91.

- **Eads Bridge Jubilee**

A story on page 30 reviews the history and construction feats of the famous Eads Bridge at St. Louis. It was completed 75 years ago this month.

- **ARBA Regional Meeting**

A recent regional-conference tryout in Georgia was highly successful. The proceedings are reported on page 35.

- **Concrete Paving**

Sinkholes had to be excavated and structures built to handle drainage along a new location. Job details, page 37.

- **State Equipment Bureau**

Page 41 tells how Missouri buys and repairs her 2,000 pieces of heavy equipment with a minimum of red tape.

- **Grading Through Rangeland**

As reported on page 52, about 42 per cent of an 8-mile grading job in New Mexico required drilling and shooting.

- **Jungle Pipe Line—**

And 60 miles of service road—to develop New Guinea oil wells. The full account is on page 58 of this issue.

- **Bridge Piers**

Pier construction for a new bridge across the Kennebec River at Augusta, Maine, is described in detail on page 72.

- **Water Works Enlarged**

Motorized buggies handled concrete over distances of 400 feet on a $2,592,400 contract for the Metropolitan Water District, La Verne, Calif. (page 79).

- **Right-of-Way Acquisition**

A hot potato if ever there was one, but Los Angeles is doing all right, according to the story on page 93.

(You will find "In This Issue" on page 4)

C. & E. M. Photo

This Cedarapids PA asphalt plant produced hot-mix for Bayer & Mingolla Co.'s contract at the Burlington, Vt., Municipal Airport. A typical batch was 2,300 pounds.

Apron and Runway Improved at Airport

Contractor Sets Up New Asphalt Plant to Produce Hot-Mix; Military and Civil Work Involved

✦ THINGS have been buzzing in a construction way at the Burlington, Vt., Municipal Airport where the Bayer & Mingolla Co. of Worcester, Mass., has been engaged in both military and civil improvements. The military aspects of the construction involve enlarging a parking apron and paving it with plant-mix bituminous concrete, together with building a new taxiway for the use of a National Guard flight unit. Civil work at the field includes extending one of the runways to a 5,000-foot length, thereby improving the classification of the airport from Class 3 to Class 4; constructing a 450 x 216-foot paved apron for transport-type planes in front of the new administration building; and constructing an automobile access road and parking space, as well as walks in the building area. The military work is a Corps of Engineers, U. S. Army, project, while the non-military construction is sponsored by the Civil Aeronautics Administration and the City of Burlington.

In addition to these two Bayer & Mingolla Co. contracts, a third major contract got under way last fall for the construction of an administration building at the airport. Wright & Morrisey of Burlington has this contract. The administration building will cost approximately $226,000, of which Burlington's share is $56,500. It is scheduled for completion this summer.

The CAA field work covered by the Bayer & Mingolla Co. contract will cost around $161,000, of which $40,250 is contributed by the City of Burlington. Last fall the grading for the runway extension was completed, while the bituminous surface treatment was left for this year as soon as the weather would permit such work. The National Guard apron and taxiway construction was completed last fall at an approximate cost of $150,000.

Burlington Municipal Airport

The Burlington Municipal Airport is on U. S. 2, 3.3 miles east of Burlington, which is located in northern Vermont on the shores of Lake Champlain. Burlington's population of 27,6[illegible] makes it the largest city in the state. The field is a port of entry into Canada. Colonial Airlines planes out of New York City, and Northeastern Airlines planes from Boston, use it when they are making stops to and from Montreal.

The new building and its appurtenant work were necessitated by the marked increase in airplane passenger traffic to and from Burlington. The runway extension was required so that an instrument landing system could be installed on that runway and greater safety be provided for heavier aircraft. By increasing the regularity and dependability of service for the Burlington area, the instrument landing system will be another major advance at the airport, which is even now one of the

(Continued on page 11)

Foundation Work Starts New Bank

Beautiful Modern Design And Concrete Form-Panel Work Highlight First Stage of New Building

✦ THE new First National Building in Amarillo, Texas, is slated to be one of the most beautiful modern pieces of architecture in the southwest. Located at Eighth Avenue and Tyler Street, the huge new ten-story building is being built at a cost of approximately $2,500,000. Bank Building & Equipment Corp. of America, with central headquarters offices in St. Louis, Mo., has the contract with the First National Co. of Amarillo.

Scarcely a month after work began on February 21 this year, the foundation excavation had been practically finished, and concrete work was already under way. Under the supervision of Charles Surbaugh, Project Superintendent for the contractor, the job is scheduled for completion 15 months after the start of work.

Bank Building & Equipment Corp.'s contract includes not only the field construction phase, but the architectural design and engineering supervision as well. Thus the contractor is responsible, within state building codes generally, to Virgil Patterson, President of the First National Bank, under whose general direction the new work was conceived and brought about.

It is expected at this time that the permanent tenants of the building will be the First National Bank of Amarillo, the Shamrock Oil & Gas Corp., Phillips Petroleum Co., and Hagy Harrington & Marsh.

(Continued on page 87)

WALL FLOOD-PROOFS CITY

C. & E. M. Photo

A base section of the Parkersburg, W. Va., floodwall is poured by E. J. Albrecht Co. (see page 6). A Northwest No. 6 crane swings an Insley 1½-yard bucket over the hopper, which is hung on rails supported by timber cribbing.

Dirt Records Soar On Dam Embankment

Davis Dam Earth Movers Believe New Records Set As Operators Get "Hot" In More Ways Than One

By RAYMOND P. DAY,
Western Editor

✦ "EIGHT hundred and fifty loads! Nearly 11,000 yards! Yuh'll have to go some t'beat *that* record!" chortled the swingshift boss.

Ford, the graveyard boss, coolly looked over the main borrow-pit area at Davis Dam, contemplating what he knew was a new shift record. "I hope you're not figurin' those three Eukes settin' under the shovels now, Bill . . . or those four still on the road to the dam."

"Sure I am. They belong to my shift, and . . ."

"Like hell they do. You can't take credit for dirt that's not in the dam. By God, I'm taking them seven loads! You take what you earned, Bill: 843 loads, not 850."

A few minutes later, after he had left the job, Bill Matthews said to a companion, "Damn, I had Ford about half hot under the collar tonight."

A few minutes later, after he had started the graveyard shift rolling in high gear, Ford sent word to T. L. Terry, the General Superintendent of Davis Dam. Terry woke up from a sound sleep to hear a voice saying gleefully, "I stole seven loads off of Matthews!"

That is the kind of competition which set for Davis Dam one of the best performance records made in recent times on a Bureau of Reclamation earth-moving job. In the short time interval between October 19, 1948, and March 31, 1949, nearly 4,000,000 cubic yards of earth fill was moved, completing the embankment. Less than ten months after the Colorado River was diverted at the dam site the job was done. At times the competition between shift bosses and individual operators of equipment was razor-edged.

Performance Records Set

In the short month of February, the dirt-moving fleet handled 1,150,000 cubic yards of dirt. This shrank by 20 per cent when massive sheepsfoot rollers tamped it into the embankment. That was the month when 587 working hours were the total amount possible for a machine to work—and it saw one of the machines, a 2½-cubic-yard Bucyrus-Erie shovel, work 572 hours at a constant loading rate of 300 cubic yards an hour. Everything else worked in proportion to this example of high-gear operation.

The entire equipment fleet worked right up to the crest of the dam: 38 Eukes roared in day and night with their loads, while the placing area got smaller and smaller. "Towards the last, the equipment swarmed over the fill so thick and fast we had a hard time finding a bare spot to take a density!" one of the Bureau of Reclamation engineers said.

And then one day the earth-moving job ended almost as suddenly as it had begun. The noise of fast hauling equipment stopped. Once more it was possible to drive over the haul roads in peace and comfort. A lay-off of about 350 men connected with the great performance silenced the camp, and stenographers complained, "It's like a graveyard around here."

The Equipment

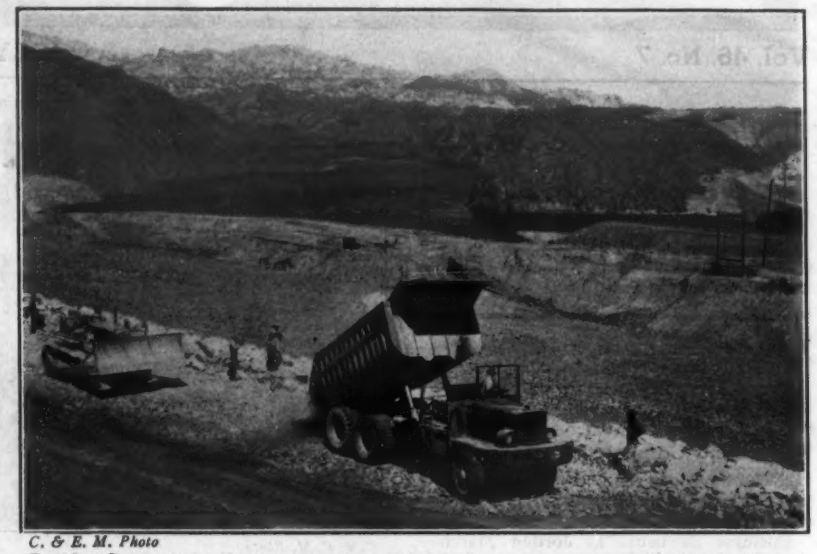
The selection of equipment was, of course, governed by the character of the loading and hauling job. Two years back, when the forebay channel and powerhouse site were excavated, the material was separated by grizzly into 4-inch-plus and 4-inch-minus size. All of this material, more than 3,000,000 cubic yards, lay stockpiled on the Nevada side of the Colorado River downstream from the dam about ½ mile.

Clay for the impervious center core lay in a borrow pit 3 miles upstream from the dam, in such shape that it, too, would load well if power shovels were used.

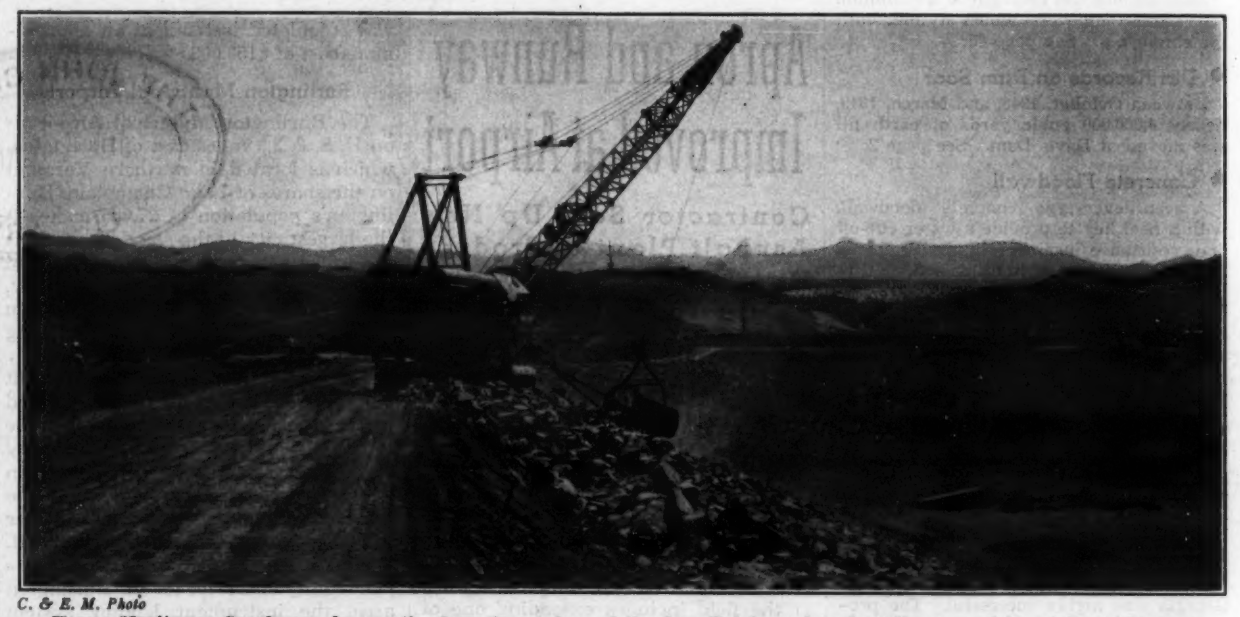
So the loading equipment consisted entirely of power shovels, with one dragline. Power shovels included a Lima 1201, with a 3½-cubic-yard dipper; a Bucyrus-Erie 54-B, with a 2½-yard dipper; and three Northwest 80-D's with 2½-cubic-yard dippers. The dragline was a Manitowoc 2-yard Speedcrane.

Fast high-capacity hauling equipment on rubber was required to get the output of the shovels to the dam. A fleet of 38 Euclid wagons was selected. These

(*Continued on next page*)



C. & E. M. Photo
Looking down across the upstream face of Davis Dam, we see one of Camillo Brothers' trucks dumping riprap. This work is being subcontracted by Jack Yount Const. Co.



C. & E. M. Photo
Here a Manitowoc Speedcrane dresses the downstream face of the dam. It takes a lot of wooling around to get the rocks even.

This picture of Davis Dam was made facing downstream to show the Colorado River meandering off down through the land.

C. & E. M. Photo

consisted of 16 belly-dumps, rated at 13 cubic yards on this job; and 22 end-dumps rated at 9.7 cubic yards.

Auxiliary equipment which helped out with the job of processing the dirt was numerous. There were two 5,000-gallon water tank wagons, mounted on Euclids. Two Caterpillar No. 12 motor graders were used to polish the haul roads and keep the earth leveled on the fill. Four Caterpillar D8's pulled dual batteries of special USBR-specification sheepsfoot rollers, made to those specifications by Southwest Welding & Equipment Co. of Alhambra. These massive rollers had tamping feet 9 inches long.

There was also a D8 with a scarifier, four D8's with bulldozer blades, and two D8 spares for miscellaneous work. One of the special rigs, made up to blend earth and moisture after conventional equipment proved unsatisfactory, consisted of a D8 with a "middle-buster", or lister plow. The plowshares were hard-faced to resist abrasion. The rig was made up in the shop, and was mounted on a heavy steel frame to resist the stresses caused by pulling the plow through the soil.

The only other special rig for this job consisted of an Emsco Junior pavement-breaking machine fitted with a large tamping foot. This machine was shop-mounted on a Caterpillar D4 tractor, and powered by a 250-cfm Le Roi compressor. It was made up after conventional pneumatic hand machines proved to be too slow to keep up at the abutment lines of the dam. According to officials of the Utah Construction Co., this machine not only stayed up with the fill but it replaced a crew of 20 men with hand tampers.

Such was the equipment fleet. How well it performed is shown in the new records established on the job. And in no small part, the performance of this equipment fleet is also largely the result of an excellent system of mechanical service and repair set up on the job.

There was a large shop for this purpose, staffed by trained mechanics on each shift. Mobile service units reached all equipment unable to come in for service. Since the hauling equipment was standardized 100 per cent, down time was reduced to an absolute minimum by having parts on hand likely to fail. Spare power plants for the Eukes sat in the shop, ready to replace any engine which failed.

Speed Marks Earth-Moving

Speed of loading, speed of hauling, and speed of handling the dirt when it arrived at the dam highlighted the job. Of these three features, one of the hardest to achieve was the work on the fill.

Bureau of Reclamation specifications were quite strict insofar as moisture content was concerned. The specifications required that an optimum moisture content of from 11 to 12 per cent, generally, be in the soil and well blended throughout before the material could be rolled.

In the impervious clay core, this result was easier specified than achieved. So to speed up that part of the work, pumps saturated the clay borrow with water from the Colorado River. But a thin shelf of hardpan through most of the clay borrow prevented proper penetration of the pit, and a man was stationed with a pressure hose at each shovel, to spray the water into the dirt at the time it was loaded.

It was difficult to get too much moisture into the dirt, because it dried out quickly; and in those instances where excess water got to the borrow pit, the shovels simply moved over to a drier spot. Flooding and hand sprinkling put almost all the required moisture into the material, leaving only a light shot or two on each lift for the water tankers.

To further complicate fill operations, the earth part of the dam is divided into six zones, all of which had to be maintained on neat and ever-changing lines.

Utah Construction Co. Photo
This is the east fill of Davis Dam at elevation 572-575, with the Arizona abutment in the background. The present contract is expected to be finished by July, 1950.

These zones, looking through from the riprap cover on the reservoir side, are first an unsegregated zone, then 4-inch-minus, a clay center core, a 4-inch-minus, and an unsegregated zone.

As the earth arrived on the fill and was dumped, bulldozers and the two motor patrols spread it out. The 8-inch lifts were then scarified, and if more water was needed, it was added. Then the D8 and its lister plow passed through the material, turning and blending the soil and moisture. When it had been thoroughly blended, sheepsfoot rollers made an average of 12 passes to get the high density required.

At the abutments, the Emsco tamping machine moved along the rock line and stomped the earth dense and tight against the clean rock. One of the Euclids occasionally came in close, dumped a load, and this material was then dozed in ahead of the tamper.

After being processed and tamped in place, the material occupied only 80 per cent of the space it occupied in the bor-

(*Continued on page 69*)

Contractors and Engineers Monthly

A NATIONAL BUSINESS PAPER

For the Highway and Heavy-Construction Industry

Issued Monthly by Buttenheim-Dix Publishing Corp.
Editorial and Business Office: 470 Fourth Ave., New York 16, N. Y.

Acceptance under the Act of June 5, 1934, at Mount Morris, Illinois, authorized March 26, 1945.

William H. Quirk, Eastern Editor — Raymond P. Day, Western Editor

Edgar J. Buttenheim, President
George S. Conover, Vice President
Edwin Wagner, Secretary and Treasurer
Edward George Allen, Jr., Promotion Mgr.

Donald V. Buttenheim, General Manager
Myron MacLeod, Advertising Manager
Albert T. Miller, Pacific Coast Manager
Edgar M. Buttenheim, Asst. Advertising Manager

BRANCH BUSINESS OFFICES

Daily News Bldg., Chicago 6, Ill. — Duncan A. Scott & Co., Mills Bldg., San Francisco 4, Calif. — 2313 Ben Lomond Drive, Los Angeles 27, Calif.

When requesting change of address, please send old as well as new address.

A Case for Communication

Dr. Robert Maynard Hutchins, Chancellor of the University of Chicago, recently said: "Many engineering schools do not teach English; they teach Engineering English, a lingo which effectively cuts their graduates off from everybody but other engineers. Yet 50 per cent of the graduates of engineering schools do not go into engineering, and therefore cannot communicate with anybody, except at alumni reunions."

Dr. Hutchins' thought should be considered seriously. It strikes with forceful directness at the heart of today's prevalent problem for the professional engineer: communication.

Practicing engineers today, for the most part, can communicate with their fellow professionals in the engineering field. But what about their relationship with state legislatures, the public, Rotary and Kiwanis Clubs—with people who are not engineers but who control authorizations for engineering works?

Never before has it been more important to the paying public that engineering data, however complex, be transmitted to elected legislators in the simplest possible language. Complicated aspects, obtuse statistics, and contradictory values must be presented clearly and concisely to give the public the facts and enlist its support. Only the engineer can do it, for he is in the key spot.

In 48 state legislatures and the Congress of the United States, we have seen, in this year of 1949, the vital relationship between the engineer and the public. No matter how worthwhile the individual construction project, it depends for its funds on public support. And favorable public feeling depends largely on the simple, truthful giving of facts through the written and spoken word.

In hundreds of situations, *communication* is the essence of the relationship between the tax producer and the tax spender, as represented by the several public engineering agencies. And unless our engineering graduates are taught how to express themselves with clarity and simplicity, they are not being adequately trained even for their professional roles. For simple words do more communicating.

Construction Safety, 1948

Industry had a banner safety year in 1948. The National Safety Council reports a substantial reduction in both frequency and severity of accidents to employees as compared with 1947.

The accident frequency rate for the construction industry, based on the number of disabling injuries per 1,000,000 man-hours, was 16.51 in 1948—a reduction of 32 per cent from the year before. The accident frequency rate for all industries was 11.49—a 13 per cent reduction from 1947.

The severity rate for the construction industry, based on time charges (in days) per 1,000 man-hours, was 2.51—a reduction of 5 per cent. An all-industry average severity rate showed 1.12, a 9 per cent reduction from 1947.

AASHO Announces Essay Award Winners

The winners of the 1949 National Essay Contest conducted by the American Association of State Highway Officials have been announced by Carl W. Brown, AASHO President. The contest had two divisions: one for junior civil-engineering students and one for members of civil-engineering faculties. Winner of the Student Division is Michael Lash, Jr., of Tufts College, Medford, Mass. Emmett H. Karrer, Professor of Highway Engineering, Ohio State University, Columbus, Ohio, received the award in the Faculty Division.

Professor Karrer received his Bachelor of Civil Engineering degree from Ohio State University in 1930, and entered the service of the Public Roads Administration as Junior Highway Engineer. He held various posts with that organization until 1946, when he accepted the position of Professor of Civil Engineering at his alma mater. There his primary duties are supervising teaching and research in the field of highway engineering. He has been active in the work of the Highway Research Board and the Committee on Advancement of Highway Engineering, American Road Builders' Association.

Mr. Lash's home is in Yonkers, N.Y. He entered the Navy V-12 program during the war and was graduated from Tufts in 1946 with a degree of Bachelor of Naval Science. He served in the Marine Corps until September, 1948, when he re-entered Tufts, to work towards a degree in civil engineering. He is a member of Tau Beta Pi, President of Tufts Engineers' Council, and a member of the Tufts Student Chapter, American Society of Civil Engineers.

The topics for the essays, on which the competition was based, were "What I Advise My Students With Regard to Highway Engineering" for the Faculty Division, and "What I Think of Highway Engineering as a Career" for the Student Division. Much interest was shown in the contest; essays from students in 29 states and from faculty members in 17 states were in the final judging.

The two National Judging Boards also selected three outstanding papers in each division for honorable mention. Students named were Kenneth H. Latham, University of Idaho; David C. Koester, Oregon State College; and Joseph W. Williams, Lafayette College (Pennsylvania). In the Faculty Division, those selected were Professor R. A. Marr, Jr., Virginia Military Institute; Professor Ellis Danner, University of Illinois; and Professor L. J. Ritter, University of Florida.

The winners of the National awards, Professor Karrer and Mr. Lash, will receive an all-expense trip to the 35th annual meeting of the AASHO in San Antonio, Texas, October 10-14. They will present their winning papers before a general session of that meeting; subsequently the papers will be published. In addition, all of the papers reviewed in the national judging will be condensed and published in pamphlet form for general distribution.

The National Judging Board for the Faculty Division was composed of Thomas H. MacDonald, Public Roads Commissioner, as Chairman; Pyke Johnson, President, Automotive Safety Foundation; and Hon. Will M. Whittington, Representative from Mississippi and Chairman of the House Committee on Public Works. For the Student Division, the Board included Burton W. Marsh, Director, Traffic Engineering and Safety Department, American Automobile Association, as Chairman; L. S. Tuttle, Assistant to the Public Roads Commissioner; and John Gibbons, Director of Public Relations, Automotive Safety Foundation.

In This Issue

War-Ruined Harbors Are Restored to Use

Two major harbors in Greece have been reconstructed under the supervision of the U. S. Army Corps of Engineers. Located at Piraeus and Salonika, the harbors were completely destroyed by the Germans when they evacuated the area in 1944. Ships were wrecked and sunk, and thousands of tons of scrap were dumped into the harbors.

Actual reconstruction began at Piraeus on November 18, 1947, and was completed January 15, 1949. The work at Salonika Harbor began November 21, 1947, and was also finished January 15, 1949. At first the most difficult part of the job was the securing of equipment, but by the time the project was in full swing there were hundreds of pieces of equipment on it, many of them brought from various parts of the world.

As part of the Engineers' work, some 10,827 feet of quay walls and breakwater were reconstructed. Underwater operations were dangerous because of German sabotage, and divers were employed extensively on exploratory work. Two sabotaged dry docks were restored to operating condition, wrecked and sunken ships were removed, and twisted steel debris was derricked and hauled away. Thousands of tons of gravel were hauled in for fill on the restored quay walls.

Colonel D. W. Griffiths is District Engineer of the Grecian District. Contractor on the harbor jobs was Steers-Grove, operating under the managership of J. S. Thompson. Project Managers were Harry Weston and W. J. Russell.

Piraeus Harbor in Greece, which ranked third among Mediterranean ports before World War II but was completely destroyed by the Germans when they evacuated the area in 1944, has now been restored under the supervision of the U. S. Army Corps of Engineers.

City Is Flood-Proof With Wall and Levee

Concrete Structure Along River Built With Pavers, Cranes, and Buckets; Use Wood and Steel Forms

By WILLIAM H. QUIRK,
Eastern Editor

(*Photo on page* 1)

✦ AS part of the comprehensive flood-control plan for the Ohio River Basin, the Corps of Engineers, U. S. Army, Huntington, W. Va., District, is constructing a concrete floodwall, earth embankment, and appurtenances at Parkersburg, W. Va., to protect the city from floods on the Ohio and Little Kanawha Rivers. The combined length of the protection is approximately 3.8 miles, including 9,649 feet of earth levee, and 10,442 feet of reinforced-concrete cantilever-type floodwall built with a sloping base and heel key.

The earth embankment was started in March, 1946, and was completed in June, 1947, by the Hunkin-Conkey Construction Co. of Cleveland, Ohio, and Shofner, Gordon & Hinman of Los Angeles, Calif., under a $620,830 contract to the Corps of Engineers. Work on the wall got under way in December, 1947, with the awarding of a contract to the E. J. Albrecht Co. of Chicago, Ill., on its low bid of $4,262,161. This contract is presently scheduled for completion by September, 1949.

Flood Protection Needed

Up until now, Parkersburg has had no protection from floods. This busy city of around 45,000 population has a number of diversified industries; it is a trading center for an agricultural region, and a livestock market. It is located on the western boundary of the state, along the left bank of the Ohio at the mouth of the Little Kanawha River, and is 184 miles below Pittsburgh. In the past 66 years, the flood stage of elevation 598 has been equaled or exceeded 30 times; the maximum high water occurred during the 1913 flood which was the greatest on record. In March of that year the waters rose to elevation 620.9, rendering 4,000 people homeless. Another great flood, the next highest, swept the valley in 1937 and caused considerable damage. Last spring high waters again took their toll at Parkersburg when the Ohio crested on April 16, 1948, at 609.84, thereby shutting down construction operations until the rivers once more settled within their banks.

The top grade of the new levee and floodwall is at elevation 624.0, or 3 feet above the maximum flood of record. Behind that protection lies downtown Parkersburg with 765 acres of its area located on the flood plain, comprising 60 per cent of the industrial district, 30 per cent of the business district, and 10 per cent of the residential district. According to the 1939 records, this property is valued at $36,500,000. The rest of Parkersburg is on higher ground, and far enough back from the river to be beyond the reach of any floods.

In general, the levee and wall are located along the edge of the primary terrace, just back from the top of the river bank. In a few spots it was necessary to locate the protection a trifle to the landward in order to avoid excessive height. The earth levee section constitutes the upstream portion of the protective works, while the wall is built around the lower, business part of town. In addition there is a break in the earth embankment for a section of wall in front of the Parkersburg Water Works pump station.

The entire protection could not be embankment because there is not enough bench area for levee construction in those sections where the wall is built. Furthermore, the narrow strip of land along the river affords railroad right-of-way, is used for industrial development, and is much too limited in area to contain a broad-base levee. Another important site behind the wall is that of the Monongahela West Penn power plant. A 1,360-foot earth embankment section connects the wall section at the water works to the upstream end of the main wall section at the power plant.

Earth Levee Embankment

The 9,649 feet of earth levee embankment contain over 500,000 cubic yards of compacted impervious fill with a maximum height of 30 feet, but with the average height close to 23 feet. It has a crown width of 12 feet, and for levee heights of 20 feet or less, the side slopes are 2½ to 1, except for the top 4 feet where the slopes are 2 to 1. The levee starts at Murdoch Avenue where it ties in to high ground at the north or upper end of the city. From there it runs westerly to the Ohio. A small stream called Pond Run formerly entered Parkersburg from the north in this area, but with the construction of the levee its course was diverted westerly to the river into which it empties. The levee continues southerly along the river bank to meet the floodwall.

Concrete Floodwall

The concrete floodwall runs down the left bank of the Ohio past the Baltimore & Ohio Railroad bridge and the vehicular bridge carrying U. S. 50 over the river, until it reaches The Point, the downtown tip of Parkersburg at the

(*Continued on next page*)

C. & E. M. Photo
Left to right, Resident Engineer Karl C. Vogel, and E. J. Fry, General Manager and Vice President of the Albrecht Co.

Men and machines of E. J. Albrecht Co. pour a heel-key section of the new Parkersburg, W. Va., floodwall along the Ohio River. The key extends 6¼ to 10 feet into the ground and provides a water cut-off and resistance against sliding.

In this river-side view of the heel-key pour, we see a MultiFoote 34-E dual-drum paver up on the bank, and an Insley bucket discharging concrete into a hopper and elephant trunk. The Northwest No. 6 crane is using a 50-foot boom.

City Is Flood-Proof With Wall and Levee

(*Continued from preceding page*)

confluence of the Ohio and Little Kanawha Rivers. It continues up the right bank of the latter river, under another B. & O. Railroad bridge and a bridge carrying State Route 2, until it once again reaches high ground near Fifth Street where the Little Kanawha is crossed by a span carrying U. S. 21. Downstream 2½ miles from The Point, the Ohio splits its course to pass around Blennerhasset Island, famous as the site of the meetings of Aaron Burr and his associates when they were planning to establish a southwestern empire in 1805.

The 10,442-foot reinforced-concrete wall is of similar construction throughout. It is a cantilever-type wall with a heel key to provide a water cut-off and resistance against sliding. The key extends into the ground below the river-side edge of the base anywhere from 6½ to 10 feet deep. It is wedge-shaped, being 1 foot 6 inches wide at the bottom and from 1 foot 9 inches to 3 feet 3 inches at the top, according to the depth of key. The base is built on a 1 on 4.5 slope to conform to the river bank, thereby increasing the effective height of the structure. The difference in elevation between the river-side and land-side edges of the base varies from 4 to 8 feet. At the higher land-side edge the base is 1 foot 6 inches thick to 1 foot 9 inches. At the lower river-side edge the thickness of base ranges from 1 foot 8 inches to 3 feet 2 inches. The base width approximates the height, varying from 19 feet 6 inches to 39 feet 9 inches.

Rising from the base is the stem section of wall, anywhere from 19 feet to 33 feet 3 inches in height. At its top is a 2-foot coping over an 18-inch throat. The river face of wall is vertical, while the land face is battered 10 on 1 for heights above 24 feet, and 15 on 1 for heights under 24 feet. At the base the stem is from 2½ to 4½ feet thick, according to the height. The base is covered with a minimum of 2 feet of compacted fill on the river side and from 1½ to 3¾ feet on the land side, according to the height of wall. In some areas the fill on the river side is covered with riprap, 1½ feet thick, placed on a 6-inch layer of gravel.

C. & E. M. Photos

Appurtenant Works

The project includes intercepting all the city sewer lines, and directing their flow to six pump stations behind or in the wall. The stations have a total capacity of 122,250 gpm. Construction of the three largest, exclusive of equipment installation, has been included in the current contract. The three small stations will be completed under another contract.

Also in this contract are 13 gate openings, from 5 to 45 feet wide, which give access through the wall to the river banks, the railroad tracks, and to various industries. In time of high water the gates are closed with stop logs fitted between the aluminum trestles and the concrete abutments at the openings.

The drainage pipe was part of the wall contract. A total of 4,000 linear feet of concrete sewer pipe, from 8 to 60 inches in diameter, was supplied by the Universal Concrete Pipe Co. of Wheeling, W. Va., and laid behind the wall. A pair of Lorain truck cranes with 30- and 50-foot booms dug the pipe trenches with clamshell buckets, and laid the network of sewers. Sheeting was required where the trenches were near buildings or streets.

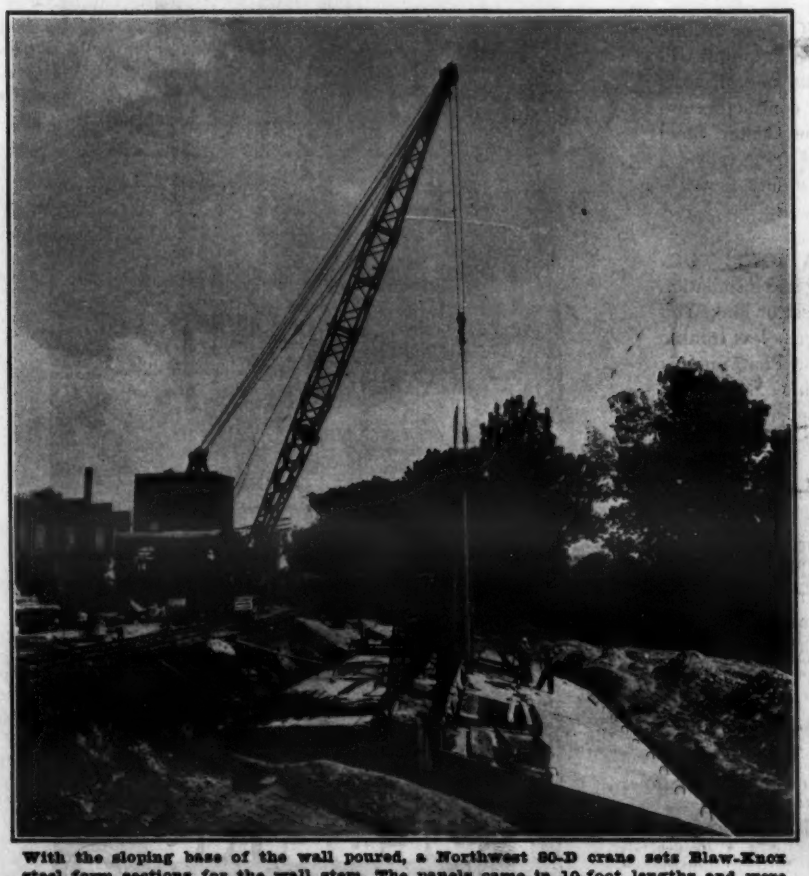
Running the length of the wall just below the land-side edge of the base is a line of perforated-concrete pipe from 8 to 18 inches in diameter. Around the pipe is a 12-inch layer of sand and gravel, and the drainage flow is directed to sewers leading to the pumping stations.

Dirt Work

Excavation for the wall contract included not only digging the trench for the wall itself, but also removing unsuitable material from the foundation beneath, and replacing it with material suitable for compaction by sheepsfoot rollers. Later, when the wall base was finished, a rolled-fill embankment was built on top of it on both sides. The trench for the heel key was dug by a No. 6 Northwest crane equipped with a special Owen 7/16-yard clamshell bucket; the rounded lip on the bucket shaped out the desired outline. A Koehring crane was used at times on this operation.

The greatest single stretch of unsuitable material taken from the path of the wall was a 1,000-foot section around The Point which had to be excavated to

(*Continued on next page*)



With the sloping base of the wall poured, a Northwest 80-D crane sets Blaw-Knox steel form sections for the wall stem. The panels came in 10-foot lengths and were bolted together in sections 20 feet long and of varying heights.

Here's a 20-foot-long section of steel stem form 31 feet high, with completed wall sections on both sides. Work platforms with safety guardrails were built on top of the forms to protect the men placing the concrete. They reached the platforms by ladders.

a depth of 35 feet. This area contained mostly vegetation and muck, and was so saturated with water that a Moretrench wellpoint system was installed to dry out the ground so that equipment could go in and work. Risers, 1½ inches in diameter x 22 feet long, were spaced as close as 20 inches on centers, and connected to 1,000 feet of 8-inch header pipe. The ground was dewatered through this pipe by three Moretrench 8-inch pumps.

Excavation was generally handled by a Northwest 95 dragline with a 75-foot boom and a Page 2¼-yard bucket, loading to a fleet of as many as ten bottom-dump 13-yard Euclids. Unsuitable material was wasted; suitable material, consisting of a combination of silt, clay, and sand, was dug from a borrow pit by a Northwest 80-D 2½-yard shovel. The average haul with the backfill by the Euclids was 1½ miles. When used either for filling the trench under the wall or for the rolled fill on top of the base slab, the material was put down in 9-inch lifts and compacted with 6 passes of the sheepsfoot roller. The dirt was spread by International TD-18 dozers; there were four of them on the job. When necessary, a sprinkler truck added water so the material could be compacted at the optimum moisture content.

Concrete Batch Plant

A concrete batch plant was set up about 4,000 feet south of the north end of the wall, adjacent to the yards of the B. & O. Railroad. Sand and gravel were obtained from the Ohio River Sand & Gravel Co. which dredged the material from the Ohio in the vicinity of Blennerhasset Island, and loaded it on barges which were then towed up the river and moored to the bank close by the batch plant. The supplier's contract was to deliver the aggregate in stockpiles at the batch plant, so the material was handled in the following manner:

The coal-burning derrick boat New Martinville, with a 76-foot boom and a Blaw-Knox 1¾-yard clamshell, unloaded the sand and gravel from the barges into a 20-ton hopper bin on shore at the foot of the bank. From there the aggregate dropped onto the first of a system of 24-inch Barber-Greene conveyor belts which moved the material up the bank and stockpiled it at the plant. Four conveyors—a 120-foot, a 45-foot, and two 60-foot belts—were employed in that order to carry the material from barge to plant. They were powered respectively by two 15-hp and two 7½-hp motors which were driven by an International 100-hp diesel-generator set.

Ohio River sand was too coarse for use alone in the mix, so a finer grade of sand was obtained from a local pit and blended in with the other aggregate. Cement was obtained from the Universal Cement Co. at Universal, Pa., and shipped in bulk cars to the B. & O. siding. There it was unloaded, by a screw conveyor beneath the track and an enclosed elevator, to a Butler 450-barrel cement bin. Alongside of this bin to the west was a Butler 300-cubic-yard 3-compartment aggregate bin holding the two sizes of gravel and the coarse sand. Adjacent to this big aggregate bin and on the west of it was another Butler bin holding 75 yards of the fine blending sand.

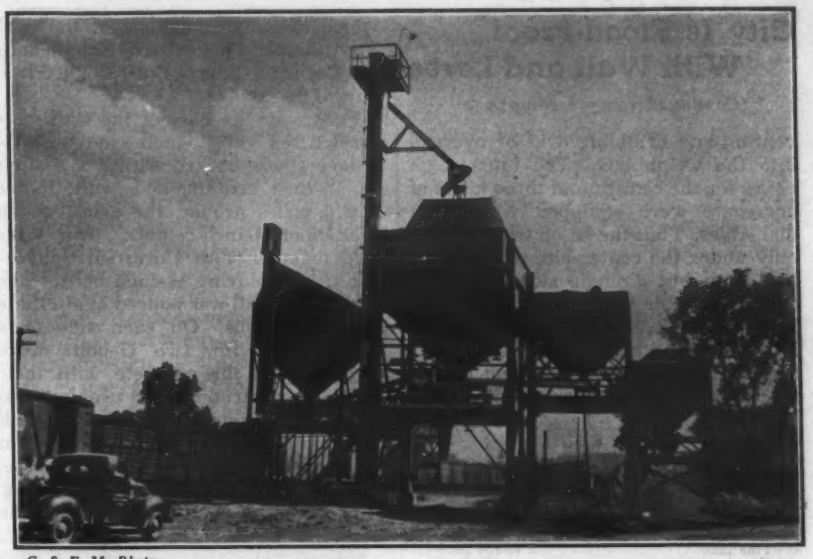
Batching the Mix

The batch plant was set up in a unique way in order to load and get the batch trucks away as quickly as possible. The three bins were laid out in a row from east to west. From the three stockpiles of coarse sand and the two grades of gravel, a Northwest 6 crane with a 50-foot boom and a ¾-yard clamshell bucket loaded one size of aggregate at a time into a former Army International half-track. This vehicle easily negotiated the uneven going around and over the aggregate piles, and dumped the material into a hopper set at ground level just north of the cement bin. The hopper was covered with steel bars so that the half-track could run over it during the dumping.

From the bottom of the hopper the aggregate moved along on a 35-foot x 24-inch conveyor belt to the bottom of an enclosed 75-foot elevator placed between the cement bin and the large sand and gravel bin. At the top of the elevator a turn head and chute enabled the batch-plant operators to fill any of the three compartments that might be running low. The fine-sand bin was filled by the crane directly from a stockpile behind it; its 75-yard capacity was usually sufficient to last for a week of concreting operations.

From the fine-sand bin and the cement bin, belt and screw conveyors, respectively, ran to weigh boxes on a platform under the large center sand and gravel bin. A 2-speed motor was installed on the cement screw conveyor to slow the movement down, thus pre-

(*Continued on next page*)



C. & E. M. Photo

The batch plant for the Albrecht job consisted of three Butler bins: left to right, a 450-barrel cement bin; a 300-yard 3-compartment aggregate bin; and a 75-yard bin for the fine or blending sand.

City Is Flood-Proof With Wall and Levee

(Continued from preceding page)

venting any dribbling over or overrun into the weigh box. The four weigh boxes for the cement and three kinds of aggregate were equipped with Kron dial scales. Thus the batch trucks drove only under the center bin, picked up a load with but a single stop, and continued on their way to the wall pour. Karl Florence, hauling contractor of Parkersburg, was given a subcontract for hauling the batches. From 6 to 7 trucks were used, each holding two batches.

The Mix

A typical 5-bag batch had the following weights:

Cement	470 lbs.
Fine sand	104 lbs.
Coarse sand	956 lbs.
Gravel, ¾-inch	1,146 lbs.
Gravel, 1½	1,145 lbs.
Water, 5¼ gals. per bag of cement	219 lbs.
Total	4,040 lbs.

The fine aggregate totaled 32 per cent of all the sand and gravel in the batch, while the fine or blending sand came to about 8 per cent of the total sand used. Two sizes of gravel, 1½ and ¾-inch, were used. Typical gradations of the combined coarse and fine aggregate are as follows:

Sieve Size	Per Cent Passing: Coarse Aggregate (Gravel)	Fine Aggregate (Sand)
1½-inch	98	....
1-inch	68	....
¾-inch	50	....
½-inch	30	....
⅜-inch	15	....
No. 4	0	96
No. 8	....	82
No. 16	....	71
No. 30	....	56
No. 50	....	18
No. 100	....	8

Darex air-entraining agent was added at the paver to provide greater durability and to increase the workability of the concrete. A dispenser was employed in adding the agent which contributed an average of 4 per cent of air to the concrete.

The concrete was mixed in two Multi-Foote 34-E dual-drum pavers. Water for the mix was taken from city hydrants and conveyed through a 3-inch pipe line to the pavers; the longest line from any hydrant was about 1,000 feet.

Form Work

The trench for the heel key was usually shored up with 2 x 10 uprights along each side on 5-foot centers. They were cross-braced with 4 x 4's placed horizontally on 3-foot vertical centers. No forms were used for the heel-key pours, as the concrete was deposited against the earth sides of the trench. As the trench was filled, the shoring was removed. The wall is built with a copper water stop and a ½-inch thickness of cork extending from the bottom of the heel key to the top of the stem coping at 20-foot intervals through the full width of the wall.

In order to pour as many as 10 continuous sections of heel key at a time, instead of just a single 20-foot section between the copper water stops, the contractor made up special bulkheads. The feature of the bulkheads was the bracing, which consisted of several vertical angle irons set on both sides of the cork and copper, temporarily bolted together, and left in place until the concrete was well up in the trench. Before the concrete began to set, however, the angles were lifted vertically from the trench by a crane. Although the bracing was now gone, the copper water stop and cork were held in true position by the freshly placed concrete.

In this manner, as much as a 200-foot stretch of heel key was poured at a time, instead of the usual alternate 20-foot sections, thereby saving both time and money. The heel key is heavily reinforced with steel rods which tie in to the base pours. In turn, the base reinforcing ties in to the stem steel which extends to the top of the wall. The reinforcing steel was supplied by the Carnegie-Illinois Steel Co. of Pittsburgh, Pa.

Forms for the base of the wall were constructed of 1-inch tongue-and-groove stock, backed with 2 x 6 studs on 18-inch centers, and with double 2 x 6 wales around the sides, on an average of 24-inch centers. They were held together with Universal Spi-Ro-Loc ties employing ½-inch bolts. The base of the wall was poured in alternate 20-foot sections. On each side of a 20-foot monolith, two U-bolts were embedded in the concrete with their ends left protruding for use later in anchoring the stem forms. Also, each monolith had four steel hoops buried in the concrete on each side of the base, with the rounded U parts projecting. They likewise served as ties for the stem form.

Steel Stem Forms

For a few monolithic sections of stem wall involving a transition, or a special length to fit under a bridge in a tight squeeze, wood forms were used. But all the standard 20-foot monolithic sections of stem wall were built with Blaw-Knox steel forms. The forms were built up from panels which came in 10-foot lengths and three different heights—5 feet, 1½ feet, and 1 foot. They were bolted together into sections 20 feet long and of varying height. Altogether, 16 complete sets of forms were constructed. These were divided into three groups according to the stem heights most frequently required. Thus the first group of six sets was used for walls from 19 to 24 feet high; the second group of eight for walls from 25 to 27½ feet high; and the two remaining sets for the highest pours for stems between 29 and 33½ feet.

All the forms had a 3/16-inch skin plate, and necessary adjustments in height within the group were easily made with the 1½-foot and 1-foot panel sections, either by adding or removing them from the top of the sets. Each 20-foot section of form was backed by six vertical sets of double 9-inch channels bolted together back to back with a 3-foot 4-inch spacing on centers. At the top and bottom of the form was a 10-inch channel for a wale. At the bottom of each section are two knee braces which were secured to the U-bolts set in the concrete base.

These heavy forms (one-half of a section weighed around 8 tons) were handled by a couple of large Northwest

(Concluded on next page)

cranes, an 80-D and an 85, equipped with 75-foot booms. After they were set in place, the forms were raised to exact grade elevation by jacks directly under them, and with other jacks under the outrigger and knee braces to assure perfect plumbness. The forms were then tied down to the hoops in the concrete base with guy wires having turnbuckle attachments for adjustment.

The form sections on each side of the wall were also tied securely to each other. For a typical 20-foot monolith 25 feet high, 18 cross ties were installed. The tie rods were 1⅛-inch bolts, and were placed in three horizontal rows—six ties to a row on 3-foot 4-inch centers, since they passed through the vertical channels. The lower row was 4 feet above the bottom of the wall, while the spacing of the two rows above was 7½ feet and 7½ feet. At the top the channels were fastened by ratchet connections. Work platforms with safety guardrails were built on top of the forms so that the men handling the concrete placing were in no danger of falling or being knocked off the wall. Ladders built up to the platforms made it unnecessary for workers to climb up the forms or ride the crane boom.

Concrete Operations

Concreting operations started in April, 1948, on the heel key and base sections of the wall, with the first stem monolith being poured in June. Usually two pours were going on at the same time in different locations, with the two 34-E pavers working along the river bank behind the wall. The paver booms were not used, as the concrete was discharged into Insley 1½-yard concrete buckets which were handled by cranes—a Northwest No. 6 with a 50-foot boom for most of the heel-key and base pours, and one of the larger Northwest cranes with a 75-foot boom for the higher stem pours. The cranes swung the buckets over receiving hoppers with elephant-trunk pipe at the bottom on the heel-key and base work.

During work on a base monolith, key forms were supported on bulkhead forms or were supported on adjoining completed base monoliths. Since the bucket could be lowered nearly to the top of the form being poured—resulting in a free drop of approximately 3 feet—no special means were required to prevent segregation. On the stem pours, hopper and elephant-trunk combinations were supported at the top of the forms. The concrete was placed in maximum lifts of 18 inches and vibrated with Maginniss electric vibrators, two to a monolith. The usual procedure on the stem pours was to place concrete in two alternate stem sections at the same time, using one crane and one paver. The two stems, containing a total of around 100 cubic yards of concrete, were completed in from 2½ to 3 hours.

Concrete in the base slabs was cured with Permite V169, while the stems were cured with water. Soaker hose were run along the top of the wall, and the water oozed out of them and down the sides. Stem forms were removed after 48 hours and moved along by the big cranes to the next section being readied for a pour.

Contractor's Shop Area

North of the concrete batch plant the contractor had his neatly laid out shop area. It consists of four Armco metal buildings placed in a quadrangle. All buildings have concrete floors and are illuminated with overhead electric lights. The office is 28 x 62 feet; a combined warehouse and carpenter shop is 28 x 100 feet; a maintenance shop is of similar size; the fourth and newest building measures 40 x 168 feet and was used to house and repair the Euclids.

The warehouse and carpenter shop halve the building between them. In the warehouse the copper stops are made up, while forms are constructed in the carpenter shop. Equipment for the latter shop includes a Jones Superior band saw and a DeWalt 14-inch blade table saw. A Jones Superior table saw is also used by carpenters working outside the shop.

In the maintenance shop is a storeroom for parts and supplies. When equipment is brought to the shop for repairs, it is first cleaned thoroughly outside by a Hypressure Steam Jenny, and then brought inside through a large 15-foot square sliding door. Overhead, hanging from the roof, is an H-beam on which rides a 1-ton hoist. Compressed air is supplied to the shop by a National compressor. Shop welding is done with a Lincoln 300-amp welder, while a 400-amp Lincoln driven by a gasoline engine is used for work in the field. There are also an oxyacetylene torch set in the shop, a forge, vises, and two Black & Decker power tools—an 8-inch heavy-duty bench grinder, and a ¾-inch heavy-duty electric drill.

Other equipment includes 5 pick-up trucks; 2 International platform trucks, one equipped with a winch; a fuel truck to service the equipment; and an Onan 3-kw portable light plant. All the cranes and draglines used in the dirt work were equipped with Kohler light plants, for two 10-hour shifts were worked during the excavation. The concrete crews worked one 8-hour shift.

Quantities and Personnel

The major items in the concrete floodwall contract include the following:

Excavation, common	190,500 cu. yds.
Excavation, borrow	236,300 cu. yds.
Embankment	125,700 cu. yds.
Concrete	61,110 cu. yds.
Reinforcing steel	4,190 tons
Concrete sewer pipe, 8 to 60-inch	4,000 lin. ft.
Perforated-concrete pipe, 8 to 18-inch	10,000 lin. ft.

The E. J. Albrecht Co. of Chicago, Ill., employed an average force of 250 men during the height of the construction under the supervision of B. J. Fry, General Manager and Vice President. C. Moderi was Superintendent, and W. R. DeArment was Master Mechanic.

For the Corps of Engineers, U. S. Army, Karl C. Vogel is Resident Engineer in charge of the project. Colonel A. M. Neilson is District Engineer of the Huntington District; Harry Pockras is Chief Engineering Assistant.

Vibro-Plus Moves

The Vibro-Plus Corp. has announced both a change of name and address. Hereafter the company will be known as Vibro-Plus Products, Inc., and its offices and shops will be located at 54-11 Queens Blvd., Woodside, L. I., N. Y.

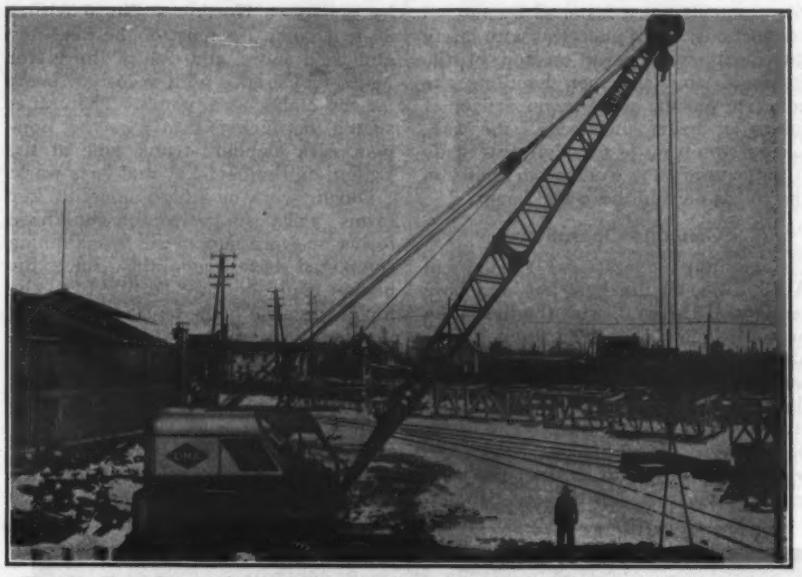
Truck-Mounted Cranes In Three New Models

Three new rubber-tired machines are announced by the Lima Shovel & Crane Division, Lima-Hamilton Corp., Lima, Ohio. The type 34-T has two engines—one for shovel and crane operations, and one for propelling the carrier. Standard equipment includes a five-speed main transmission and two-speed auxiliary transmission, which provides ten speeds forward and two in reverse. The adaptor casting is welded to the truck frame and includes machined roller paths and internal swing gear. The rotating assembly, which includes the basic features of the Lima Type 34 Paymaster, is mounted on the adaptor casting.

The 34-M differs from the 34-T in that it uses one engine to supply power for all operations including propelling. Power for propelling is transmitted from standard reversing clutches in the rotating assembly through a special train of gears and the vertical propel shaft to the wheeled mounting. A two-speed transmission is standard, with a four-speed transmission available. Air brakes are located on all wheels. Steering is accomplished by a hydraulic system. Both the 34-M and the 34-T can be equipped for crane, shovel, clamshell, dragline, or pull-shovel operation.

The rotating assembly of the Type 604-M incorporates the basic features of the Lima Type 604 machine. It uses a single engine to supply power for all operations including propelling. Rigid-type outriggers are standard equipment. The carrier has oscillating tandem-type rear axles. The 604-M is recommended by Lima for any material-handling work which requires a lifting capacity of 35 tons.

Further information may be secured from the company. Or use the Request Card at page 16. For data on the 34-T, circle No. 73; for the 34-M, circle No. 74; for the 604-M, circle No. 75.



The new Lima Type 604-M is designed for any material-handling work which requires a lifting capacity of 35 tons. It is shown here on a Maxi CC-25 wheel mounting, crane-rigged, and equipped with a 45-foot boom.

Data on Engine-Generator

Alternating-current engine-generators are described in a catalog available from the Duplex Truck Co., 830 E. Hazel St., Lansing, Mich. Duplex units in the CDA series are available in three sizes with ratings of 10, 20, and 30 kw. Various wiring combinations permit a wide range of applications.

The catalog illustrates each of the three basic units and tabulates the kva, kw at 80 per cent power factor, volt, and amperage ratings for each of the units when wired for single or three-phase operation. Specifications listed in the catalog cover dimensions, weights, complete information on the construction of the J. I. Case gasoline-engine power units, generator units, coupling, type of base, control cabinet, and fuel consumption. The catalog also lists standard and optional equipment available for the CDA line.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 112.

Cement Co. Plans Offices

The Lone Star Cement Corp. has leased the entire fifteenth floor of the new office building under construction at 100 Park Ave., New York, N. Y. The 36-floor fully-air-conditioned building is scheduled for completion on February 1, 1950. Kahn & Jacobs are the architects and George A. Fuller Co. the general contractor.

Apron and Runway Improved at Airport

(*Continued from page 1*)

busiest in New England.

The field lies at elevation 333 and has three hard-surface runways paved with bituminous concrete. The NW-SE runway is 4,300 feet long; the N-S and E-W runways are 3,600 feet long. All are 150 wide. One runway is laid out north-south, another east-west; while the third connects their extremities on a northwest-southeast axis, thus completing a triangular pattern.

At the northwest end of the diagonal runway, a 700-foot extension is being added to make the northwest-southeast strip 5,000 feet long x 150 feet wide. The present contract for this extension includes the grading, drainage, and bituminous surface treatment at the end of the existing runway. The bituminous surface treatment planned for the runway base does not constitute a pavement. It is only a temporary expedient—to keep the gravel from raveling under traffic—until sufficient funds become available to complete the work by adding a bituminous-concrete pavement. The present design is for a graded gravel course 7 inches thick on the runway and 9 inches on the parking apron, which will be covered by a keystone-mat base course and a double surface treatment. As soon as possible a 2½-inch two-course bituminous hot-mix pavement will be placed on this base to provide for the design loading of 90,000 pounds gross weight.

On either side of the 150-foot paved runways are shoulders 175 feet wide, making the landing strips 500 feet in width. Off the NW-SE runway is the parking apron of the National Guard unit and two large hangars which were constructed in 1947. From 35 to 40 P-47 fighter planes are usually based here, along with two or three DC-3's for transport purposes, and several AT-6's for use in training. A 700 x 50-foot taxiway connects the apron with the north end of the diagonal runway. A new taxiway 2,700 feet long x 50 feet wide runs from the other side of the apron to the south end of the NW-SE runway.

National-Guard Parking Apron

The original parking apron for the planes of the National Guard measured 600 x 400 feet. It consisted merely of a tack coat of MC-0 asphalt applied to a foundation course of gravel. To strengthen this apron for the heavy duty to which it was subjected, a layer of metal planking was spread over the entire area. This gave the apron the appearance of a war-time military airport in an advanced sector. In this contract the apron was enlarged by adding a 400-foot square section to the north end, making it 1,000 feet long x 400 feet wide. The 2,700-foot taxiway was also part of the contract.

Work on the apron got under way late in July, 1948, when the contractor removed the metal planking from the entire area. The old bituminous tack-coat surface was also scraped off by a couple of Caterpillar motor graders, a No. 212 and a No. 12. Then grading began both for the apron extension and the new taxiway. Around 60,000 cubic yards of dirt were moved by two Super C Tournapulls in combination with Le-Tourneau LP 12 to 15-yard Carryalls; and three Caterpillar tractors, two D8's and one D7, pulling other LeTourneau Carryalls. The D8's were hooked up with 12 to 15-yard LP models, while the D7 worked with an 8 to 11-yard LS Carryall scraper. The Tournapulls made the longer hauls; the tractor-scraper units handled the shorter dirt hauls.

Next a 6-inch layer of bank-run gravel was spread over the entire apron and taxiway area, including the original section of apron. Approximately 6,500 yards of gravel were dug from a pit of the Champlain Sand & Gravel Co. at Hinesburg, Vt., by the contractor's Koehring 304 ¾-yard shovel. A fleet of 29 trucks was rented to make the 14-mile haul from the pit to the airport. The gravel was end-dumped from the trucks, spread by the D7 dozer, and shaped by the two motor graders. On an average, 900 yards of gravel were laid in an 8-hour day. A bituminous tack coat of MC-0 asphalt was then applied to the gravel at the rate of 0.2 gallon to the square yard. The bituminous work was done by the William Cady Co. of Amsterdam, N. Y.

Asphalt Plant

On top of this tack coat, the apron and taxiway plans called for a 2-inch compacted course of bituminous concrete put down in a single lift. For this job, Bayer & Mingolla Co. selected one of its three Cedarapids asphalt plants to produce the hot-mix. The Cedarapids FA model that was chosen was the newest unit, having been shipped to the job site from the American Road Builders' Association Road Show in Chicago where it had been purchased early in July. It is a batch-type plant, and its pugmill has a capacity of up to 2,400 pounds per batch. On this job the typical batch was 2,200 pounds.

The mix was a combination of sand and gravel aggregate, and 100 to 120-penetration asphalt. The asphalt came from the Shell Oil Co. plant at Sewaren, N. J., and was shipped in tank cars to a siding of the Rutland Railroad in Burlington. While the cars were parked at

(*Continued on next page*)

C. & E. M. Photos

At the Burlington Airport, a Caterpillar D7 pushes and a D8 pulls as a Super C Tournapull loads in the soft sand of a borrow pit (above). The Barber-Greene Finisher at right is laying hot-mix in 10-foot lanes.

Apron and Runway Improved at Airport

(Continued from preceding page)

the siding, the asphalt was heated by a Cleaver-Brooks tank-car heater, and then pumped out into the transport tank trucks or distributor of the William Cady Co. and hauled to the job site. The asphalt was stored in a 7,800-gallon tank enclosed in a wooden shed thickly insulated with spun glass to retain the heat.

The Shell Co. also supplied the fuel oil for the operation of the plant. It was stored in a 3,000-gallon tank alongside a Titusville 55-hp horizontal boiler fired by a single burner. The plant burned an average of 1,200 gallons of fuel oil during an 8-hour operating day. Despite several attempts to obtain water for the boiler by drilling, the contractor struck no wells, so he had water hauled from Burlington to the airport in a tank truck. Water was stored in a 1,000-gallon tank located near the fuel-oil supply close to the boiler.

Aggregate Movement

Sand and gravel aggregate for the mix was obtained from the Champlain Sand & Gravel Co. which also supplied the material for the foundation course over the apron area. The material was taken from the pit at Hinesburg and run through a crusher, but was not separated into coarse and fine aggregate. That segregation was done later in the asphalt plant itself. Not enough fines, however, were included in this pit-run material, so a blending sand was obtained from a local pit near the airport and added to the mix. The material was stockpiled and fed into the 25-yard-capacity hopper by a Bucyrus-Erie 22-B crane equipped with a 40-foot boom and a Johnson ¾-yard clamshell bucket. The action of the crane in loading the hopper with the aggregate also helped to blend the fine sand with the other sand-gravel aggregate.

From the receiving hopper the aggregate was fed into the bottom of a cold elevator, 14 feet high, which lifted the material to a drier, 24 feet long x 5 feet in diameter. A single Hauck burner placed at the lower or outlet end heated the drier. Above the upper or inlet end of the drier was a 36-foot-high smokestack to carry off the smoke, dust, and fumes. As the job was well out in the country, no dust collector was required.

The heated aggregate from the drier was then lifted by an enclosed 18-foot hot elevator to a bank of four 6 x 4-foot vibrating screens. For this mix the sieve sizes of the four screens from top to bottom were 1¼-inch, ¾-inch, ½-inch, and No. 4. The material dropped through the screens into a 4-compartment bin with a 1-ton capacity for each size. From the bin the aggregate was released into a weigh batcher equipped with Kron dial scales; then a skip carried it 15 feet to the pugmill.

Asphalt Handling

The well insulated asphalt storage tank is heated by a 2-inch steam line connected to the boiler. A Kinney asphalt pump on the plant draws the hot bitumen from the tank to the weigh bucket through a 3-inch flexible hose line. The asphalt also was weighed out on a Kron dial scale. Both the aggregate and bitumen scales are located along the operating platform which is at ground level along the front of the plant. Instead of the steam controls on release doors which are common to most asphalt plants, the levers for the discharge gates are operated by compressed air. The plant has a small compressor to supply the necessary air.

Batches were mixed for one minute and then discharged into trucks which pulled underneath to pick up a load

(Continued on next page)

from the pugmill. The temperature of the mix was 350 degrees F, and little heat loss was experienced in hauling the material to the job with an average haul of only 2,500 feet; the maximum haul was but 3,500 feet. Three hired trucks, each holding six batches with a total weight of 13,200 pounds, hauled the plant-mix. As they left the plant the trucks were weighed on a Winslow 25-ton truck scale.

The plant was operated by two International diesel engines—a UD-9 and a UD-144. The UD-9, located near the drier and behind the boiler, ran the feeder from the receiving hopper bin, the cold elevator, and the drier. The UD-144 diesel engine, placed between the hot elevator and the aggregate screens, was hooked up to the main drive shaft of the plant. It powered the hot elevator, aggregate feeder and skip, the asphalt pump, and the pugmill.

The Mix

With this mix the average production capacity of the plant was 50 to 55 tons an hour. The weights and aggregate sizes for a 2,200-pound batch were as follows:

Sand	1,030 lbs.
Aggregate, ¼-inch to ⅜-inch	215 lbs.
Aggregate, ⅜-inch to ⅝-inch	305 lbs.
Aggregate, ⅝-inch to 1-inch	520 lbs.
Asphalt	130 lbs.
Total	2,200 lbs.

A 6-man crew handled all the plant operations. It consisted of a superintendent, crane operator, man on the aggregate feeder, man to look after the boiler and drier, and 2 men at the scale-operating platform.

The plant is fully portable throughout. When it was moved from the railroad siding where it was shipped, to its set-up at the airport, only three separate moves were required. One was for the aggregate bin which moved along on dolly wheels; a second took care of the drier; while the rest of the plant came in the third move. The rolling sections are all equipped with air brakes. The asphalt and fuel tanks were mounted on skids for easy handling, and the boiler also fitted into a special cradle mounted on skids. Even the wooden housing built around the boiler and asphalt tank was constructed in sections which were quickly dismantled or erected within a period of 3 days.

On the field the 7,500 tons of bituminous concrete for the project was laid in 10-foot lanes by a Barber-Greene Finisher to a loose depth of 2½ inches in a single course. This lift was compacted to 2 inches after it was rolled by a Buffalo-Springfield 10-ton tandem roller. Later the hot-mix was sealed with RC-2 asphalt applied at the rate of 0.25 gallon to the square yard, and covered with a sand blotter.

The paving crew numbered 7, including a superintendent, operator on the finisher, a raker, one man on the screed adjustment, 2 shovelers, and a roller operator. The paving operations were completed by the end of October, 1948, and the remaining clean-up on the apron and taxiway contract was finished shortly atfer, by the middle of November.

C. & E. M. Photo

Personnel on the Burlington Airport job: left to right, H. B. Briggs, for the consulting engineers; Joseph Mingolla, representing Bayer & Mingolla; R. E. Beck, for the consultants; M. L. Shaloo for the Corps of Engineers, U. S. Army; F. C. Santom and V. J. Volpe for the contractor.

Airport Grading

Work on the 700-foot extension of the NW-SE runway for the Civil Aeronautics Administration got under way on September 13, 1948, and the grading was completed by the end of the year. This season a gravel base course will be laid and given a bituminous prime coat which will be followed by a surface treatment. The largest single item in the grading was borrowing some 53,000 cubic yards from a sandy knob at one end of the field to bring the runway extension up to the desired grade.

Most of this borrow was moved with three or four Super C Tournapulls pulling LP 12 to 15-yard Carryalls on an average haul of 1,800 feet. To speed up the loading in the soft sand, the contractor used a D8 tractor for pulling the self-propelled scrapers and a D7 dozer for pushing. On the fill the material was spread in 4 to 5-inch lifts by D7 or D8 dozers, and shaped by the motor graders. Sufficient compaction was obtained with the heavy equipment so that the sheepsfoot roller on the job did not have to be used.

Besides the earth work on the runway, the contractor also installed 3,500 linear feet of metal pipe underdrain, and relocated one mile of access road leading in to the airport.

Quantities and Personnel

The major items of the CAA runway-extension contract include the following:

Clearing	27 acs.
Stripping	41,000 sq. yds.
Common excavation	2,535 cu.yds.
Borrow excavation	53,080 cu. yds.
Gravel base course	5,000 cu. yds.
Bituminous prime coat	8,350 gals.
Bituminous surface treatment	4,850 gals.

The design of the CAA improvement

(*Concluded on next page*)

Apron and Runway Improved at Airport

(*Continued from preceding page*)

at the Burlington Municipal Airport and the supervision of the construction were handled by the consulting engineering firm of Fay, Spofford & Thorndike of Boston, Mass. Representing the consultants were H. B. Briggs, Field Engineer, and R. E. Beck, Resident Engineer.

On the apron and taxiway project for the National Guard, Carl Brink was Resident Engineer for the Corps of Engineers, U. S. Army, and M. L. Shaloo was Inspector.

The contractor, Bayer & Mingolla Co. of Worcester, Mass., was represented by Joseph Mingolla, Jr. F. C. Santom was Project Engineer for the company; V. J. Volpe was Superintendent. Lawrence Bazer supervised the operations of the asphalt plant.

The Burlington, Vt., Municipal Airport is located in District 1, Region 1, of the Civil Aeronautics Administration with headquarters in Augusta, Maine. F. A. Carboine is District Airport Engineer of District 1.

Light-Duty Breaker For Gravel Plants

A double-impeller impact breaker designed for secondary crushing and small gravel installations is announced by the New Holland Mfg. Co., Mountville, Pa. The new Model 1212 uses the principle of breaking stone by impact in suspension and is said to handle all material passing a 12-inch-square opening. New Holland reports that the breaker will produce crushed aggregate as fine as 1 inch minus in a recirculating system.

Rotor rolls in the two impellers are designed to provide even-wearing breaking surfaces, since the rolls automatically rotate when the breaker is in action. Self-aligning heavy-duty antifriction bearings are used throughout. Individual drives can be rigged to each rotor assembly, or a single wrap drive can be used with idler pulley. Either flat or V-belt drives are suitable. The rotor disk is made of AISI 4140 alloy steel, and the rotor rolls are manganese or alloy steels. The breaker bars which line the inside of the breaking chamber and the liner plates, which are replaceable, are also made of manganese or alloy steels.

A baby stone breaker meets his big brother. The New Holland Model 1212 double-impeller breaker takes up the job after the Model 5050 cuts boulders down to its size.

The Model 1212 has an inlet feed opening of 12¾ x 12⅛ inches and an outlet discharge opening of 15⅜ x 66¼ inches. Each rotor assembly weighs 1,089 pounds, including the three 200-pound rolls. The diameter outside the rolls is 21½ inches. The impeller main shaft, made of high-grade alloy steel, has a diameter of 2 15/16 inches at the bearings. Weight of the Model 1212 is listed at 7,900 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 94.

Texaco Eastern Div. Mgr.

Richard J. Warg has been appointed Division Sales Manager for Texaco asphalt products in the New England states, with headquarters at Boston. He has been with the Texas Co.'s Asphalt Sales Department since 1933, and until his promotion, was connected with the Chicago division.

Not much larger than a fountain pen, the pneumatic reversible Cleco A-1 screwdriver weighs only 9½ ounces.

Powered Screwdriver Has 9½-Ounce Weight

A reversible pneumatic screwdriver has been brought out by the Cleco Division, Reed Roller Bit Co., P. O. Box 2119, Houston 1, Texas. It features a weight of only 9½ ounces, small size, and freedom from torque reaction.

The balanced impact mechanism of the Cleco A-1 screwdriver absorbs driving torque, Cleco points out; permits finger-tip operation and control; and prevents the tool from twisting in the operator's hand or jumping out of the screw slot. The tool is designed so that pressure on the bit opens the throttle valve, thus eliminating free running. Rotation can be easily reversed from the outside, says the manufacturer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 4.

Off-the-Road Tires

A new off-the-road truck tire is announced by the Pennsylvania Rubber Co., Penn-Craft Park, Jeannette, Pa. The Rock Lug Logger features heavy chip-proof S-curved lugs designed for maximum traction. It is available in all popular sizes for use on off-the-road-vehicles.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 17.

Constant-Flow Pumps

High-pressure pumps for use on power units, materials-handling equipment, and similar applications are announced in new models by the John S. Barnes Corp., 127 Walnut St., Rockford, Ill. The Constant-Flo rotary gear pumps are said to maintain continuous pressures up to 1,000 psi, and intermittent pressures up to 1,500 psi.

Barnes points out that the new pumps have the same mounting dimensions as the standard low-pressure models. Among the features claimed for them are anti-friction-bearing design and high mechanical and volumetric efficiency.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 101.

Equipment-Repair Tools

Special tools to meet the service needs of automotive and construction equipment are described in an 88-page catalog issued by the Owatonna Tool Co., 348 Cedar St., Owatonna, Minn. Catalog 49-J illustrates the various OTC tools and describes special factory-approved service kits for leading makes of equipment. Information is also provided on how to apply the OTC pulling system to remove and install bearings, gears, outer bearing races, pinions, collars, pulleys, shafts, wheels, hubs, and other tight-fitting parts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 15.

Truck-Mounted Crane Has Six Attachments

A truck-mounted convertible crane is manufactured by the Des Moines Dragline Service, 1st and Pinehill Drive, Des Moines, Iowa, and distributed nationally by the Paul M. Cole Co., 30 N. LaSalle St., Chicago, Ill. The Little Giant can be used as a crane, dragline, shovel, clamshell, trench hoe, or electric magnet. It is made in two styles: the Model M with a crane and shovel capacity of ⅜ yard, and the Model S with a ½-yard capacity. Both are powered by heavy-duty Minneapolis-Moline gasoline engines.

Among the features claimed for the Little Giants are ball-bearing turntables, cut steel gears, large internal band clutches, full-swivel fairleads, 6-foot cable leads from the fairleads to large-diameter grooved drums, one boom for shovel and trench hoe, efficient grouping of controls, large band-type rotating brakes, heavy all-steel cabs, safety boom hoists, and a variety of truck mountings. Standard boom length on the Model M is 25 feet; on the Model S, 30 feet.

The truck-mounted Little Giant can be used as a crane, dragline, shovel, clamshell, trench hoe, or electric magnet.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 46.

Pipe 3 to 36 inches in diameter can be cut by Kinmont's new torch attachment for use with the company's universal power unit.

Pipe-Rotating Unit Has Torch Attachment

A cutting-torch attachment for use with the Kinmont universal power unit is announced by Kinmont Mfg. Co., Inc., 716 W. Wilson Ave., Glendale 3, Calif. The Kinmont power unit is designed to rotate round or nearly round objects at constant speeds while circumferential work is being performed on them. The cutting-torch attachment is especially recommended by the company for its ability to maintain a smooth bevel or a square cut-off across the end of the pipe.

The wide adjustment range of the attachment permits its use on any pipe from 3 to 36 inches in diameter, and on tanks up to 10 feet in diameter when turned on a roller rack. The turning speed of the power unit can be controlled while cutting operations are in progress, to permit a smoothly finished cut. A foot switch controls the turning operation so that the operator's hands are left free to control the torch and speed adjustments. In addition to manufacturing the attachment, Kinmont also makes available engineering prints which show how it can be fabricated in a shop.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 23.

Hyster Sales Branches

The opening of the new Los Angeles area retail truck sales and service facilities at 5301 Pacific Blvd., Huntington Park, Calif., has been announced by the Hyster Co. of Portland, Oreg., and Danville and Peoria, Ill. At the open-house celebration, several hundred visitors saw the models of fork-lift trucks, straddle trucks, and mobile cranes which were on display. The staff of 14 is headed by L. W. Barclay.

A new location for the Seattle, Wash., truck sales and service has also been announced by Hyster. The new quarters are at 753 Ninth Ave., N., Seattle. V. G. Lindenberg is in charge.

Weed-Killing Sprayer Is Tractor-Mounted

Sprayers for weed-killing compounds and other liquids are made by the Automatic Equipment Mfg. Co., Pender, Nebr. Among the features claimed for these tractor-mounted units are convertibility, no weight on the tractor's front wheels, ample power, easy mounting, separate tricycle-mounted tank unit, sectional booms, wide range of height adjustments, handy controls, automatic agitation, hydraulic tank filler, safety-slide boom brace, and ease of cleaning.

Booms are available in 7, 14, 21, 28, 35, and 42-foot lengths. They feature a Springflex action which hinges the boom up and down as well as forward and back. The nozzles are designed to deliver a flat, uniform spray without heavy concentration at the edges. The orifice tips are interchangeable and can be turned for easy alignment of the spray. Each nozzle has a 100-mesh monel wire cloth. The nozzles are available in three sizes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 95.

Booms for this sprayer made by Automatic Equipment Mfg. Co. are hinged up and down and forward and back. They are available in six lengths from 7 to 42 feet.

FIRST CLASS
Permit No. 280
(Sec. 510, P.L.& R.)
New York, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c-POSTAGE WILL BE PAID BY

Contractors and Engineers Monthly

470 FOURTH AVENUE

NEW YORK 16, NEW YORK

FIRST CLASS
Permit No. 280
(Sec. 510, P.L.& R.)
New York, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c-POSTAGE WILL BE PAID BY

Contractors and Engineers Monthly

470 FOURTH AVENUE

NEW YORK 16, NEW YORK

Contractors and Engineers Monthly - Request Card - July '49

Please send me further information on the new products and also copies of catalogs described in this issue, as circled below.

1	2	3	4	5	6	7	8	9	10	92	93	94	95	96	97	98	99	100	101
11	12	13	14	15	17	18	19	20	21	102	103	104	105	106	107	108			
22	23	24	25	26	27	28	29	30	31	109	110	111	112	113	114	115			
32	33	34	35	36	37	38	39	40	41	116	117	118	119	120	121	122			
42	43	44	45	46	47	48	49	50	51	123	124	125	126	127	128	129			
52	53	54	55	56	57	58	59	60	61	130	131	132	133	134	135	136			
62	63	64	65	66	67	68	69	70	71	137	138	139	140	141	142	143			
72	73	74	75	76	77	78	79	80	81	144	145	146	147	148	149	150			
82	83	84	85	86	87	88	89	90	91	151	152	153	154	155	156	157			

I would also like information from advertisers on:_____

Name_____ Title_____

Business Connection_____

Address_____

City_____ Zone_____ State_____

Listing of your Business Connection is essential for handling literature request.

Contractors and Engineers Monthly - Request Card - July '49

Please send me further information on the new products and also copies of catalogs described in this issue, as circled below.

1	2	3	4	5	6	7	8	9	10	92	93	94	95	96	97	98	99	100	101
11	12	13	14	15	17	18	19	20	21	102	103	104	105	106	107	108			
22	23	24	25	26	27	28	29	30	31	109	110	111	112	113	114	115			
32	33	34	35	36	37	38	39	40	41	116	117	118	119	120	121	122			
42	43	44	45	46	47	48	49	50	51	123	124	125	126	127	128	129			
52	53	54	55	56	57	58	59	60	61	130	131	132	133	134	135	136			
62	63	64	65	66	67	68	69	70	71	137	138	139	140	141	142	143			
72	73	74	75	76	77	78	79	80	81	144	145	146	147	148	149	150			
82	83	84	85	86	87	88	89	90	91	151	152	153	154	155	156	157			

I would also like information from advertisers on:_____

Name_____ Title_____

Business Connection_____

Address_____

City_____ Zone_____ State_____

Listing of your Business Connection is essential for handling literature request.

A capacity of 45 gph and a working pressure of 80 to 120 pounds mark the new Hypressure Jenny Service Master.

Steam-Cleaner Unit Has 45-Gph Capacity

A steam cleaner designed especially for use by garages, contractors, fleet owners, and others having need for a small-size unit, is announced by Homestead Valve Mfg. Co., Inc., P. O. Box 30, Coraopolis, Pa. The Service Master occupies a floor space of 27 x 37 inches. It is oil-fired and electric-motor-driven.

The new Hypressure Jenny has a working pressure of from 80 to 120 pounds and a normal capacity of 45 gph. With an Adjusta-Blast gun, the capacity can be stepped up to 240 gph. Among the features claimed for the Service Master are instant starting, instant steaming, an automatic nozzle control mechanism, and selective compound and fuel feed. The Service Master is available in three models for portable or for permanent installations.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 12.

Utility 1-Yard Dirt-Mover

A hydraulically controlled and operated earth-moving scoop is described in a 4-page folder issued by the Maquoketa Co., Maquoketa, Iowa. The 1-cubic-yard Scoopmaster is a tractor-drawn pneumatic-tire-mounted unit designed for dumping, carrying, shoulder and roadside grading, and other light-duty earth-moving operations.

The catalog describes several features claimed for the Maquoketa unit, including its simplicity of operation, moveability, 3-way-action hitch, position of the wheels behind the cutting blade, hydraulic operation, sturdy construction, convertibility to grader operations, and the fact that it works in any soil. Specifications cover the capacity, width and depth of cut, length, height, width, weight, cutter bar, method of control, and bearings.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 9.

FWD Changes in Personnel

M. O. Stockland, Jr., Advertising and Sales Promotion Manager for The Four Wheel Drive Auto Co., Clintonville, Wis., became Director of Sales for the company on July 1. His assistant is G. F. DeCoursin, Manager of Production Planning.

The company also announces that Robert L. Koehler, former Director of Sales, and John E. Battes, Western Zone Sales Manager, have resigned to join a partnership with Oscar E. Betow in the FWD Pacific Co., which distributes FWD trucks throughout California.

Diamond Core Drill For Jeep Mounting

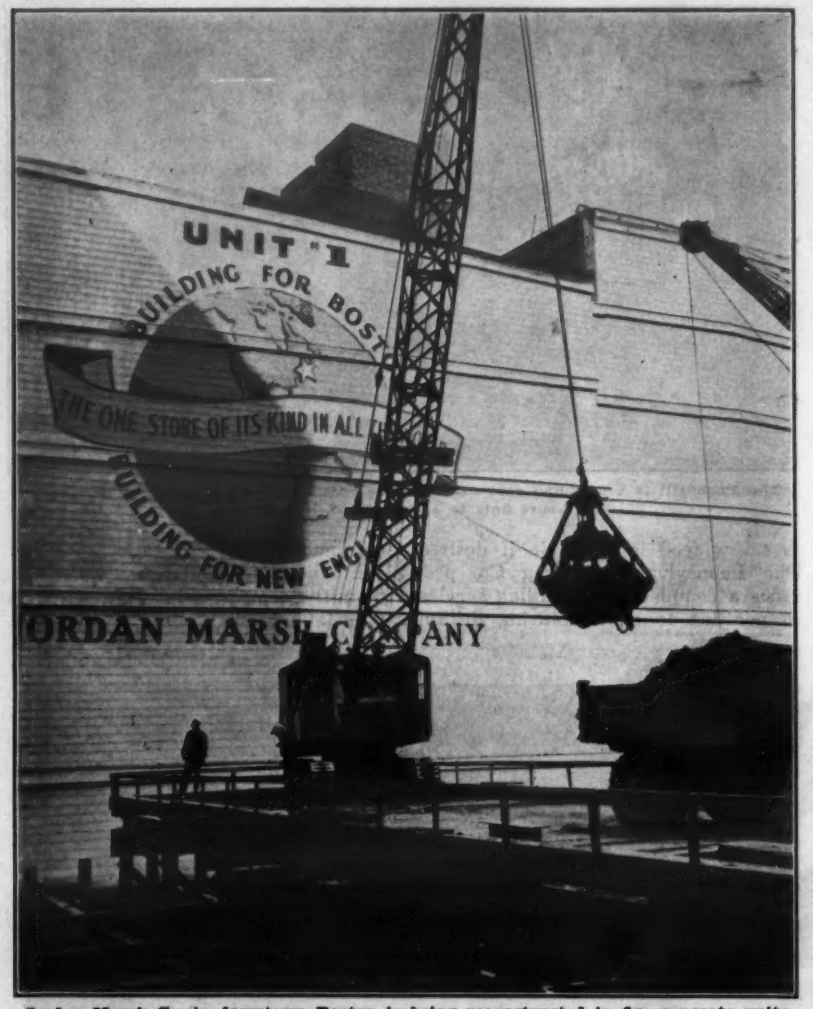
A diamond core drill for use with Jeeps is manufactured by the Pennsylvania Drilling Co., 1201 Chartiers Ave., Pittsburgh 20, Pa. It is designed so that tools and auxiliary equipment can be hauled behind it in a 2-wheel trailer, and the drill itself can be removed in a few minutes to free the Jeep for other uses.

The Penndrill is rated at 450 feet of 2⅛-inch-core hole to 1,000 feet of ⅞-inch-core hole. Power is secured from the Jeep motor. The drill has an aluminum mast which can be raised by one man, and a hydraulic swivel head with a built-in oil-circulating system.

The Penndrill is a diamond core drill for use with Jeeps. It is rated at 450 feet of 2⅛-inch-core hole to 1,000 feet of ⅞-inch-core hole.

A screw feed is available if desired. The Pennsylvania Drilling Co. provides a complete core-drilling service, in addition to manufacturing drilling equipment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 47.



Jordan Marsh Co. in downtown Boston is being reconstructed in five separate units while business goes on as usual. Spencer, White & Prentis, Inc., of New York City is building the foundation for Unit 1 of the new store. Here, against the back of the existing store, a Northwest crane working from a trestle loads excavated material to a truck.

Store Being Rebuilt One Unit at a Time

Deep Foundation Dug From Trestles; Street, Store, And Subway Supported by Sheeting and Bracing

By WILLIAM H. QUIRK,
Eastern Editor

✦ JORDAN Marsh Co., New England's largest department store, located in the heart of downtown Boston, is being rebuilt on its original site, while business goes on as usual. The big emporium, bounded by Washington, Summer, Chauncy, and Avon Streets, will be reconstructed in five separate operations, one unit at a time, transforming the entire block into a modern 13-story building. Construction of the first unit is now under way, and is scheduled for completion in September. Construction of the remaining four units to follow will take from 5 to 10 years to finish.

The foundation for the first unit, the subject of this article, extends approximately 35 feet below the level of the street. The rest of the store along one side of the hole was supported by sheeting and bracing, as were also the banks of the streets on the other three sides, together with a subway and station. The foundation consists of a thick reinforced-concrete mat covering the entire area. Excavation for the foundation, the placing of the heavy steel bracing, and the pouring of the concrete mat were done from three temporary steel trestles erected over the site.

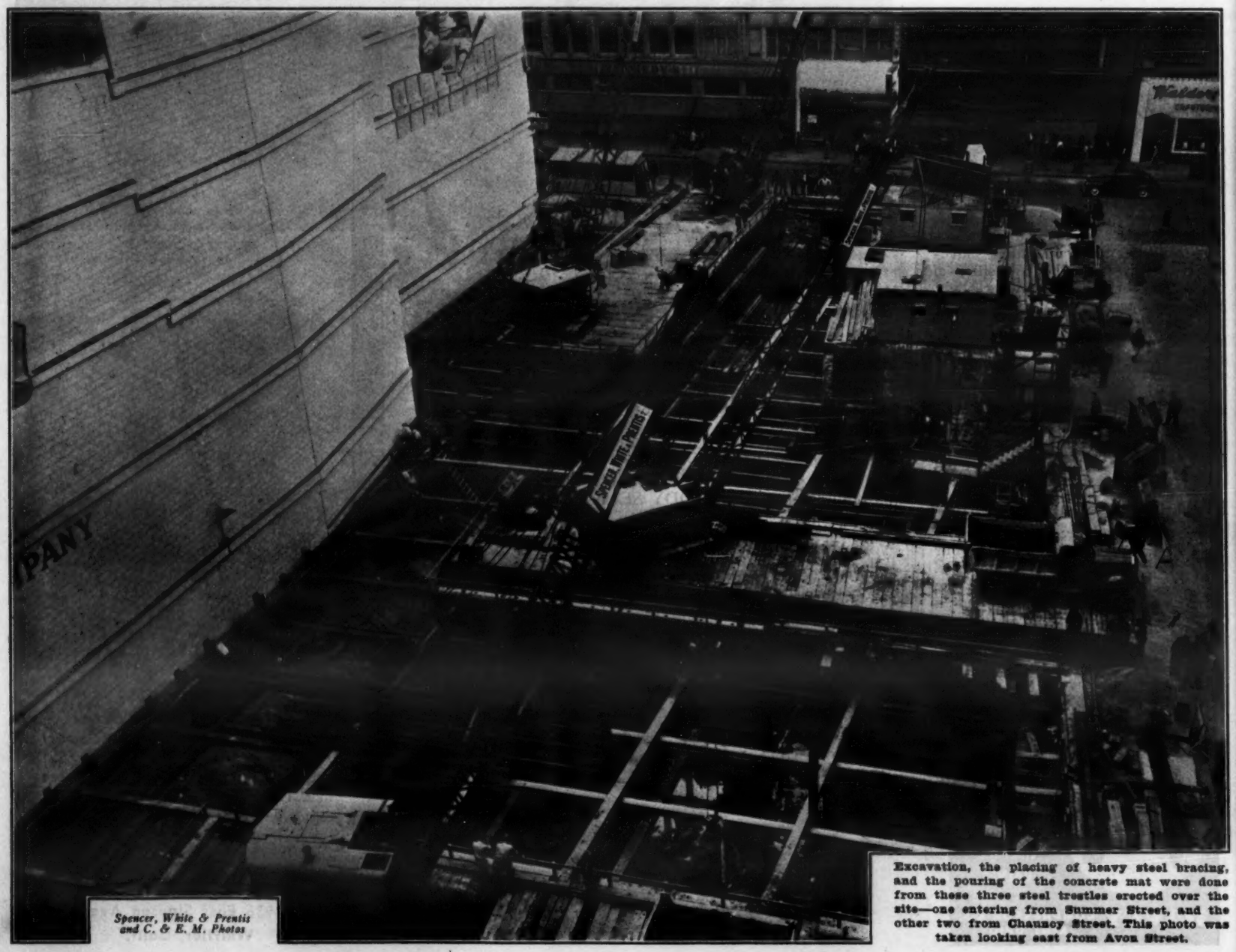
The Jordan Marsh Construction Control Bureau is directing the reconstruction of the store, the oldest and largest of its kind in New England. Thompson Starrett Co. of New York City is the general contractor on this first unit. For the present, the first unit will include seven stories and two basements, but the design and construction will accommodate six additional stories. The foundation for the first unit, a section about 250 x 100 feet at the south end of the block, was built by Spencer, White & Prentis, Inc., of New York City. The entire block, which is nearly square, measures 360 feet from Washington to Chauncy Streets, north to south, and 250 feet, east to west, from Summer to Avon Streets.

Old Buildings Razed

Numerous buildings of various ages and types of construction comprise the present store. Over the years these 5-story structures have been joined together to form one big store, which already has expanded across Avon Street to occupy several buildings opposite the original block. A bridge over the street at second-story level connects the two stores.

During the construction of the first new unit, nothing could be permitted to interfere with the normal business operations of the adjoining portions of the store in the remainder of the block. This unusual condition, together with the deep foundation work and neces-

(Continued on page 20)

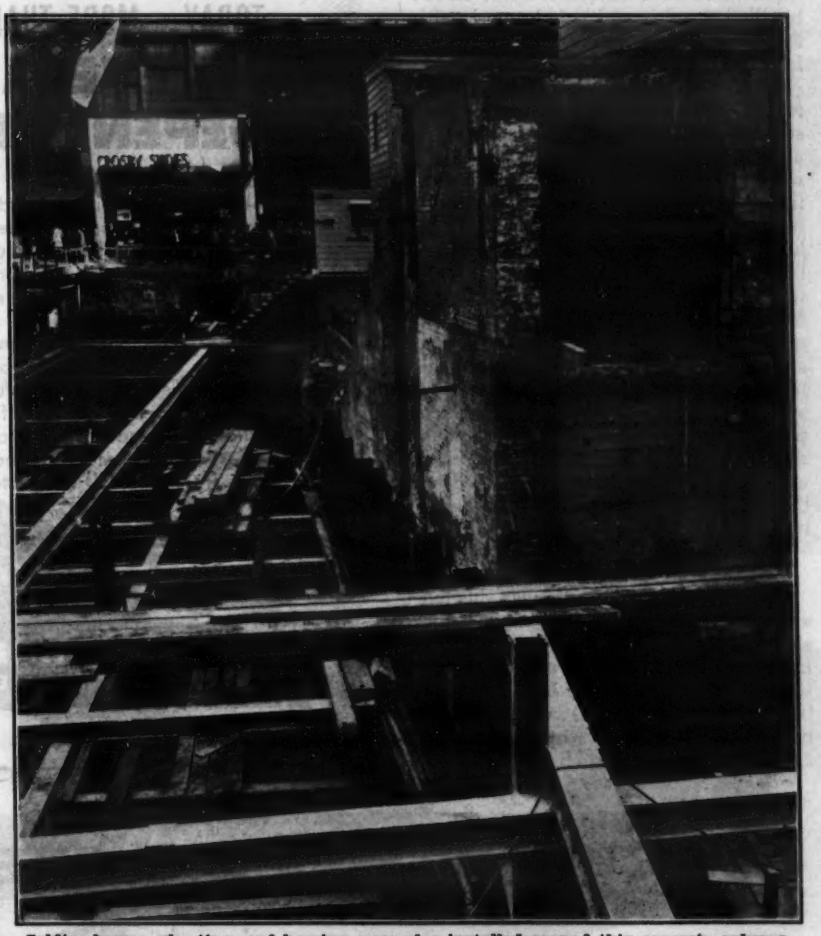


Spencer, White & Prentis and C. & E. M. Photos

Excavation, the placing of heavy steel bracing, and the pouring of the concrete mat were done from these three steel trestles erected over the site—one entering from Summer Street, and the other two from Chauncy Street. This photo was taken looking east from Avon Street.

From the spectators' platform on Summer Street, sidewalk superintendents had a good look at the wall sheeting built along the back of the existing store. It consisted of H-pile soldier beams with horizontal wood poling boards, ringed with steel wales held by steel-beam cross braces in both directions.

As the horizontal cross-lot bracing went in, each member was pre-stressed with hydraulic jacks to loads of from 20 to 40 tons to prevent any movement of adjoining ground.



Soldier beams, sheeting, and bracing were also installed around this concrete subway-entrance structure inside the building lot on the Chauncy Street side of the hole.

The same type of sheeting was built all around the site to support side banks and adjoining structures. Here it is from the Avon Street side. Notice how the longitudinal braces are strengthened with diagonal struts. In the background is the bridge which connects buildings of the Jordan Marsh Co. store on both sides of Avon Street.

Inside the subway-entrance structure the contractor managed to excavate a narrow hole and build a foundation known as the butterfly footing because of its peculiar shape. Here a Marlow pump set up on the platform at left unwaters the hole by pumping water from a sump pit constructed in the bottom of it.

Store Being Rebuilt One Unit at a Time

(*Continued from page 18*)

sary underpinning, was complicated still further by the tightly constricted area available for construction operations. The adjoining streets of the Hub section are narrow, yet carry extremely heavy traffic. Two main subways of the Metropolitan Transit Authority also run along Washington and Summer Streets, and cross at their intersection.

Razing of these obsolete 5-story stone and brick buildings, to make way for the first unit of the new store, began in April, 1948, and was finished that August. As soon as wrecking was completed, a Northwest 1¼-cubic-yard shovel loaded out the debris which had accumulated and also the masonry walls of the old basement. It then began excavating down the center of the job, taking out as much material as possible but leaving ample berms to support the adjoining streets and structures.

A ramp was built down into the hole for the trucks which hauled the material to a dump about 4 miles away. C. C. Smith Co., Inc., of Watertown, Mass., handled the dirt and rubble work with 5-yard trucks—as many as 18 on the long haul through heavy traffic.

In the meantime, temporary concrete footings were constructed inside the south building line of the existing store along the length of the Unit 1 site. Still within that end of the store, a steel framework was erected above the footings to support the floor joists which had been held up by the masonry bearing wall. The entire width of the store was then closed in at this framework, for the full height, with a partition of studding, sheathing, insulating paper, and asbestos shingles. The joists projecting beyond the framework were cut off, and the entire bearing wall, which was 4 feet thick at the bottom, was then removed. The store was thus given a new back wall, and work proceeded on the new foundation with the old bearing wall out of the way.

Soldier Beams

The perimeter of the site was sheeted around the building line to support the side banks, the adjoining store buildings, and the subway structures. The wall sheeting consisted of H-pile soldier beams with horizontal wood poling boards; it was ringed with steel wales held by steel-beam cross-braces in both directions. The cross-bracing was prestressed by jacking and wedging. The soldier beams are either 12-inch BP 53-pound or 12-inch WF 65-pound sections, 60 to 65 feet in length and driven on 6 to 8-foot centers. Along the back of the existing store, the faces of the soldier beams were driven on the concrete line.

Driving was done by two rigs working either from street level or in the hole. A Northwest Model 6 crane and a Manitowoc 2000B crane, both with 75-foot booms, drove the soldier beams with McKiernan-Terry 9B3 hammers. The hammers worked on compressed air supplied by two Ingersoll-Rand 500-cfm compressors. Both compressors discharged into a 4 x 12-foot air receiver. From there a 4-inch line piped the air to within a short distance of the driver where the hammer hose connection was made. Driving was down to hardpan for the piles along the old building. The rest of the soldier beams were driven to firm bearing and a minimum of 10 feet below subgrade.

Bethlehem Steel Co. supplied both the soldier beams and the structural-steel bracing, which was shipped to a siding of the New Haven Railroad in South Boston. It was stored there for lack of room at the job site, 4 miles away. As the steel was needed, it was hauled to the job in trailer trucks by C. E. Hall & Son of Somerville, Mass.

The soldier beams held the 3-inch horizontal sheeting with their flanges; along the present store line, they also supported the needle beams used in the underpinning. The loads carried by the last row of 20 columns at the south end of the store were transferred in part to the soldier piles through the needle beams. The rest of the load was carried by a second row of temporary concrete footings which were constructed to support the other end of a pair of needle beams passing on both sides of each column.

The footings were placed 21 feet 6 inches back of the line of soldier beams, and averaged 3½ feet square x 18 inches deep. The needles themselves were generally either a pair of 24-inch WF 76-pound, or 18-inch WF 64-pound beams, 25 or more feet long. They were shored up on two 33-inch WF 130-pound sections. At the other end, the needles were supported on a channel welded to two adjacent soldiers beams. This careful and thorough underpinning was done because of the proximity of the deep excavation to the foundation of the adjoining store still in service.

As another interesting feature of the construction of the soldier-beam and 3-inch timber sheeting, hay and gravel were placed between the sides of the cut and the steel and timber barricade. In this way the water ran out of the wet ground, filtered through the hay and gravel, and reached the bottom of the hole from which level it was pumped out. But the dirt did not leach through, being retained in back of the sheeting.

(*Continued on next page*)

Thus no ground was lost, and no movement occurred in the streets surrounding the hole. Three Marlow 4-inch Mud Hogs pumped ground water from a sump at the lowest level of the cut up to the street level. Before entering the sewer, however, the water passed through a settling basin to clear out the mud and dirt. The settling basin was simply an old boiler cut in half down the middle and laid horizontally on the ground.

Pre-Stressed Bracing

The soldier beams, which were driven to a firm bearing and no less than 10 feet below the level of the second basement floor, remain in the foundation structure. The vast network of structural steel installed to brace the beams and sheeting is only a temporary construction until the concrete foundation walls are poured. The bracing consists of three tiers of wales—upper, middle, and lower—which, of course, are heavily cross-braced. When installed, the upper tier is 9 feet below street level at elevation 22.0; the middle and lower tiers are at elevations 14.0 and 4.0 respectively.

Structural-steel members for both the wales and struts were all WF sections, either 12-inch 53-pound, 14-inch 73-pound, or 14-inch 89-pound, depending upon the loading. Average spacing of the struts in the north-south bracing was 12 feet on centers, while those in the longer longitudinal bracing, in the east-west direction, were about twice as far apart. The longitudinal bracing was composed primarily of three main members in each tier. At the west end, the longitudinal braces were strengthened by means of diagonal struts.

As the horizontal cross-lot bracing was installed, each member was pre-stressed with hydraulic jacks to loads of from 20 to 40 tons. This pre-stressing exerted pressure through the wales, soldier beams, and horizontal sheeting against the sides of the banks, thus preventing any movement of the adjoining ground. Metal "ears" were first welded against the outside flange of the wale to hold the pair of Watson-Stillman 40-ton hydraulic jacks in place. The other ends of the jacks, which were laid parallel to the ground, rested on angles welded to the sides of the struts. Two jacks were used, one on each side of the brace being pre-stressed. The jacks were pumped to the desired pressure, and the space thus opened up between the wale and the end of the strut was closed with steel plates and wedges. The wedges were tapered ½ inch to 0, and were driven with a sledge hammer until the zero reading of the gage on the hydraulic line to the jacks indicated that all the load had been picked up by the wedges.

Three Working Trestles

After the first tier of wales and bracing was installed at elevation 22.0, the cellar floor level, the excavation of the site continued from trestles by means of cranes and clamshell buckets. As the hole opened up, additional horizontal sheeting was set in place behind the soldier beams. Three steel working trestles were erected over the site to support the heavy construction equipment, and to facilitate the excavation, the setting of the steel bracing, and the pouring of the concrete foundation. Trestle 1 enters the site from the south off Chauncy Street, with its center line 33 feet 6 inches from the building line of Avon Street to the west. This trestle is 68 feet 6 inches long.

Trestle 2 also leads in to the job from Chauncy Street, with its center line 70 feet east of the center line of trestle 1, and parallel to it. Trestle 2 is 60 feet long. Trestle 3, 79 feet long, enters the site from Summer Street on the east. It is centrally located over that section of the site. All trestles have their decks at street level, and every portion of the job can be reached from at least one trestle by cranes using only a maximum 35-foot radius with their booms.

The trestles were erected so that they would help support the steel-bracing system, and vice versa. Steel piles 60 feet long were driven to firm bearing to support the trestle. Bents averaged 12 feet on centers, and each bent contained three 10-inch 42-pound bearing piles on 12-foot 6-inch centers. They were capped with 14-inch WF 73-pound or 14-inch WF 89-pound sections, 25 feet long, supported on ⅞-inch bearing plates over the tops of the pile beams. Six 12-inch 53-pound stringers were laid from cap to cap to hold the 6 x 12 deck planking. On each side and on the end of the 24-foot 2-inch roadway is a 12 x 12 guardrail curb. In the interest of safety, a 2 x 4-inch handrail 2 feet 6 inches high was spiked to the 12 x 12-inch guardrail curb.

All the steel work, trestle and bracing, was welded together. Seven Hobart electric welding machines were on the job for that purpose—two at 400 amps and five at 300 amps.

Excavation

Besides the Northwest Model 6 and the Manitowoc 2000B cranes already mentioned with reference to the pile driving, job crane equipment included another Manitowoc of the same size, a Northwest Model 5, and a Lorain TL20 truck crane. The truck crane usually saw service in the South Boston storage yard loading steel, while the other cranes excavated and set steel.

In excavating, the booms on the cranes were shortened from 75 to 60 feet for speedier work. Clamshell buckets were used to dig down to within about a foot of the bottom grade, with Stuebner ¾-yard tip-over buckets employed for the remainder. The latter were filled by hand shovels. Holes were opened in the deck of the trestle in order that that portion of the site might also be excavated.

The building site is mainly a glacial till composed of sand, gravel, and clay, but at the south end there is a bed of soft clay and sand in lenses of varying depth. This soft clay is encountered about 40 feet below the street, and has a maximum depth of 40 feet at the corner of Summer and Chauncy Streets.

(*Continued on next page*)

Store Being Rebuilt One Unit at a Time

(*Continued from preceding page*)

Beneath the clay is glacial till on top of soft shale, which is about 80 feet below street level. The shale goes down more than 80 feet deeper. The material excavated for Unit 1 weighs about the same as the load of the new structure.

The bottom of the concrete-mat foundation is 35 feet below street level, or at minus-4.0 elevation. Portions of the grade went below this level to an elevator pit and a sump pit, 48 and 50 feet below street level. Steel sheeting was driven around the perimeter of the sump pit after general grade had been reached. As the excavation continued below the level of the upper tier of wales and bracing, the middle and lower tiers were installed in that order. The construction operations were viewed by the public from a covered spectators' platform located at the northeast corner of the site along Summer Street.

Butterfly Footing

Along the Chauncy Street side of the hole is the entrance structure for the subway that runs along the Summer Street side of the site. The concrete structure contains ticket booths, stairs, escalator and operating machinery, and is nearly 100 feet long x 27 feet wide. Since this area is inside the building lines, with the store being built above it, an unusual situation was encountered in the construction of a foundation at this particular corner. But the contractor managed to build a footing within the structure by excavating a narrow hole inside the concrete walls. Within these cramped confines, hemmed in by the station and walls of the subway, workmen poured a 5-foot-thick concrete slab with its base at elevation minus 6.0. From its peculiar shape, roughly about 25 feet square, this foundation became known on the job as the butterfly footing.

Soldier beams were driven around the outside walls of the subway entrance, while the sheeting and bracing were installed and tied in to the rest of the work. The load of the subway structure was carried by brackets welded to the soldier beams. The load was transferred to the soldier beams by means of dry packing. Around the walls above the footing soldier beams were driven and wales and bracing installed. Here again the subway structure was carried by brackets welded to the firmly driven soldier beams. Thus the whole structure was well underpinned before any work began on the footing.

In order to drain this area, a sump pit was constructed at the bottom of the hole. The sump was made by driving vertical 2-inch wooden sheeting in the shape of a small box in the center of the footing. The dirt was removed from within and a screened box 16 inches square was built and set up in the center of the excavated hole. Pea gravel was placed around the screened box and then the 2-inch vertical sheeting was pulled. Water seeped through the ground to the sump, and from there it was pumped to the surface. The pair of columns that will be erected on top of this footing will have a total load of 2,300 kips. The largest structural-steel member will also be erected at this location when a girder 10 feet deep and 70 feet long is set up to span the subway entrance.

Concrete Mat Foundation

The reinforced-concrete mat foundation which covers the entire area was laid on a 10-inch blanket of gravel spread out over the subgrade. The mat is 6 feet thick and is heavily reinforced with 1-inch steel bars on 12-inch centers both ways. The concrete was laid in sections 40 feet wide, the first pour being made the early part of November, 1948. The New England Erecting Co. of Boston placed the reinforcing steel, while the transit-mixed concrete was delivered to the job by two Boston concerns—J. P. O'Connell Co. and the Boston Sand & Gravel Co. Steel setting and concrete placing were under the jurisdiction of the general contractor.

As the mat was placed, the surrounding foundation walls were also constructed 2 to 3 feet thick. Tucker Concrete Forms Co. of Boston built the forms. Of the 8,500 cubic yards of concrete required for Unit 1, approximately 7,000 yards of Class A went into the mat and foundation walls. By the end of last year the foundation was completed, and this year the Lehigh Structural Steel Co. of Lehigh, Pa., furnished and erected the 2,300-ton steel framework for the building.

This first unit has 63 main steel columns resting on base plates up to 7 inches thick, set into the concrete mat. The framework will be all-welded construction, and will have floor slabs of 3,000-pound concrete up to 8 inches in depth. All the floors, both above and below ground, are on 16-foot vertical centers, with the street-floor finished grade at 34.75 elevation. The subbasement therefore is 32 feet below that, or at elevation 2.75. About 500,000 red bricks will be required to close in the building which will have a Colonial architecture motif.

Completely air-conditioned, the store will have no windows for lighting or

(*Concluded on next page*)

Spencer, White & Prentis, Inc., Photo
This is a general view of the bracing erected, at the 22.0 and 14.0 elevation levels, during foundation work on the new Jordan Marsh Co. store.

ventilating, but a few apertures will be cut in the walls to relieve the severity of the all-brick sides. Along the Washington and Summer Streets sides, the building will overhang the sidewalk from 21 to 24 feet, cantilevered out from the first row of columns. At the fifth floor there is a set back. Eventually, when the entire block is completed, a truck ramp will enter the store from the Chauncy Street side and run the full length of the building down to the level of the sub-basement. For the present in Unit 1, the first section of the ramp will be floored over and devoted to sales space until all five units are reconstructed.

Unit 1 will contain seven Westinghouse elevators—four passenger, two service, and one freight—with provisions in the design and construction for two additional passenger elevators. Moving stairways will also be built in some of the subsequent units, but not in this first section. Unit 1 will contain stairways to all floors.

Personnel

The Jordan Marsh Co. store is being constructed under the supervision of the Jordan Marsh Construction Control Bureau of which Walter M. Stone is Management Director and Frank Parkhurst is Construction Supervisor. The design of the foundations and all structural work was made by Maurice A. Reidy of Boston, whose firm acted as consulting engineers for the architects, Perry, Shaw & Hepburn, also of Boston.

The general contractor, Thompson Starrett Co. of New York, was represented by Andrew Peterson, Superintendent. Albert Di Giacinto is Job Manager for Spencer, White & Prentis, Inc., of New York, Engineers and Contractors, which built the foundation. The foundation contractor employed a maximum force of about 150 men and worked two shifts from 8 a. m. to midnight.

Engineer Given Army Award

The Department of the Army award for exceptional civilian service goes to Rossiter M. McCrone, Engineer of the Mississippi River Commission. The award was made for Mr. McCrone's development of an asphalt blanket to prevent erosion of river banks. In his method, a heated asphalt and sand mixture is dumped through flowing water onto the bank.

The award states, in part: "By outstanding perseverance and ingenuity he devised a method of underwater bank paving with sand-asphalt mix deposited in mass, which can be accomplished during flood stages, thereby affording a means of emergency protection not feasible with the standard articulated concrete revetment. His pioneer work in this new method of bank paving has aroused the keen interest of the entire engineering profession, and gives promise of substantial benefits to the United States."

The award was presented by Brig. Gen. P. A. Feringa, President, Mississippi River Commission.

For his method of underwater riverbank paving, Rossiter M. McCrone (left), Engineer of the Mississippi River Commission, receives The Department of the Army award for exceptional civilian service. Brig. Gen. P. A. Feringa, President of the Mississippi River Commission, presents the award.

For cranes from 10 to 25-ton capacity, the Keystone Krane Karriage has a 4-speed transmission with a speed range of 2 to 10 mph in either direction.

Carriage Will Mount Cranes of 10-25 Tons

The Keystone Krane Karriage, a one-man self-propelled mounting for all makes of cranes from 10 to 25-ton capacity, is presented for the first time by the Equipment Division of the Keystone Driller Co., 419 Wood St., Pittsburgh 22, Pa.

The Karriage has a four-speed transmission, with a speed range of 2 to 10 mph in either direction. Propulsion power is obtained through the travel clutches and the vertical travel shaft of the crane. There is complete control of the machine from the operator's seat in the cab. The unit's short turning radius is designed to make it useful for close work. All wheels have air-operated brakes. Steering is hydraulic.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 123.

Barrows in Two Sizes

Wheelbarrows in two sizes are manufactured by the Champion Wheelbarrow Co., P. O. Box 138, Byron Center, Mich. The Model 450 C-R has a heaped capacity of 4½ cubic feet; the Model 350 GP-R, 3½ cubic feet. The Champion barrow is equipped with a 2-ply 4:00 x 8 pneumatic tire with a 6-inch hub.

The Model 450 C-R has a 26 x 37-inch tray made of 16-gage steel; the Model 350 GP-R has a 26 x 34-inch tray made of 18 to 19-gage steel. The trays are fastened through the handles by 5/16-inch carriage bolts. The large unit has a weight of 70 pounds; the small, 59 pounds. Both units are carefully balanced for easy handling, says Champion.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 91.

Paint Resists Rust

A new heavy-duty aluminum anti-rust paint known as Rustrem Super Aluminum is announced by Speco, Inc., 3142 Superior Ave., Cleveland, Ohio. The new paint utilizes a recently developed aluminum paste which is reputed to be brighter and longer-lasting than that ordinarily employed in paint manufacture. Its aluminum content is approximately double that of most aluminum paints, according to the manufacturer. It is suitable for both interior and exterior use, and is furnished in proper consistency for either brush or spray application.

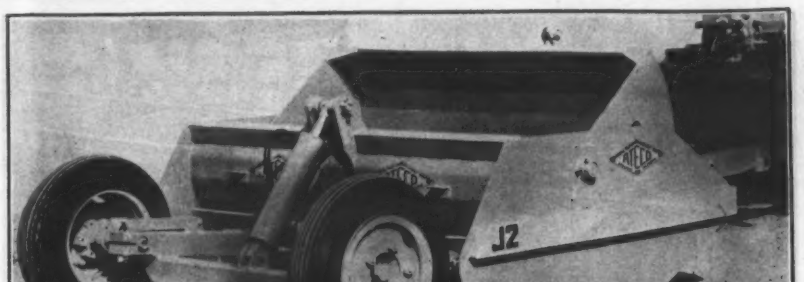
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 134.

Carry-Scraper Unit

A new carrying scraper, the J-2, is being manufactured by the American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif. Weighing a little over a ton, it operates like large modern scrapers, yet is convertible into a high-lift hydraulically controlled tool carrier for deep tillage operations. For close finishing the cutting edge has a positive control, and control of the large front apron is independent. Demountable wide-flanged wheels, Timken bearing hubs, removable axles, and reversible cutting edges are other features

Heaped capacity of the J-2 is 1.80 cubic yards; struck capacity is 1.44 cubic yards. Width of the cutting edge is 6 feet; overall width is 6 feet 5 inches; overall length is 13 feet; depth of spread is 0 to 11½ inches; depth of cut is 0 to 4 inches. Tires are 6-ply 6:50 x 16.

The Farmall H and M, the I-4 and I-6, and the TD-6 and TD-9 can handle the J-2 scraper. Ateco intends to make special attachments for the J-2 tool carrier in the immediate future. Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 121.

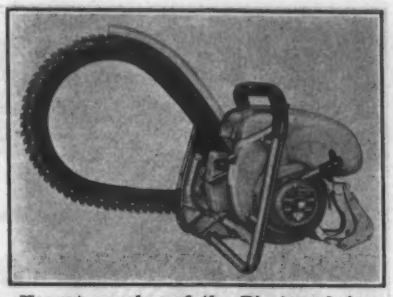


Ateco's J-2 scraper can be converted into a high-lift hydraulically controlled tool carrier for deep tillage operations.

One-Man Bow Saw

A lightweight one-man bow saw for use in felling, limbing, and bucking operations is available from Henry Disston & Sons, Inc., 474 Tacony, Philadelphia 35, Pa. According to the manufacturer, the new bow saw eliminates pinching during bucking cuts. It is powered by a 3½-hp 2-cycle Mercury gasoline engine.

The saw has a straddle-type chain which travels on an open circular guide rail. An extra-long high-strength aluminum-alloy casting is designed to keep extraneous matter from catching in the chain and to give the guide rigidity. The saw operates at 4,000 rpm, and can be used interchangeably with the 18, 24, and 30-inch guide rails of the company's one-man chain saws.



Newest member of the Disston chain-saw family is this one-man gasoline-driven bow saw. It eliminates pinching during bucking cuts, says Disston.

Other features include full precision-bearing construction, specially designed fuel meter, fully protected crankshaft-type magneto, self-rewinding Magna-pull starter, automatic positive chain lubrication, easy-to-hold pistol-grip handle with built-in controls, and a clutch which is disengaged by a squeeze on the handle.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 26.

Cartwright Joins Bros

H. A. Cartwright, well known in the asphalt field as a designer of spraybars and distributors, has joined the research and engineering staff of the Wm. Bros Boiler & Mfg. Co., Minneapolis, Minn. His duties will be connected with the expansion of that organization's asphalt road machinery program.

Buckets for stripping pipe from 4 to 16 inches in diameter have been developed by The Cleveland Trencher Co. They excavate down to and along both sides of the pipe to its horizontal diameter.

Stripping Buckets Fit Trenching Units

Special trenching buckets to strip pipe lines for take-up and repair have been developed by The Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 15, Ohio. The patented stripping buckets are designed for installation on the digging wheel of Cleveland's trenching machines.

The buckets are available in two sizes—16 and 22 inches—for stripping pipe from 4 to 16 inches in diameter. They excavate down to and along both sides of the pipe at least to its horizontal diameter; this frees the pipe for take-up with no bending damage due to earth bind. The contour of the buckets facilitates their following and staying on the line despite side-bends. And because they are practically concentric with the pipe being exposed, all danger of tooth or rooter damage is virtually eliminated, Cleveland reports.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 10.

Mixer in Large Size

A tilting concrete mixer with a 6-cubic-yard capacity is announced by The T. L. Smith Co., 2857 N. 32nd St., Milwaukee, Wis. In addition to its 6-yard capacity, it has an overload guarantee of 10 percent. According to the manufacturer, one batch will fill a 4½-yard truck-mixer or a 6⅛-yard agitator.

The mixer is marked by light weight, low overall height and length, and sturdy construction. Among the features claimed for it are automatic feed-chute charging, tilt-and-pour discharge without segregation, complete control of discharge, all-welded support pedestals and tilting frame, 100-hp electric motor direct-connected to the transmission by a splined-shaft double universal joint, and push-button or manual controls.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 8.

Catalog on Power Jacks

Many applications of air motor-power jacks are illustrated in an 8-page bulletin recently issued by Duff-Norton Mfg. Co., 2709 Preble Ave., Pittsburgh 30, Pa. The bulletin stresses their time-saving features and tells how a Y-connection between jacks enables one man to operate two jacks simultaneously.

The bulletin includes a detailed explanation of the construction and safety features of the jacks, and lists overall specifications of the 20, 50, and 75 to 100-ton-capacity units. It points out their application for crane repairs, pushing pipe, pressing bushings, bridge repairs, and general maintenance work.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 115.

Hot-Mix Surface For Widened Road

Trucks Haul Material 22 Miles From Plant to Job Where Finisher Lays It In Three Courses

✦ THE Ohio Department of Highways improved a 9.86-mile stretch of U. S. 33 last season by widening the pavement 3 feet on each side, and laying a new surface over the full 22-foot width. The material both for the widening strips and the three courses of pavement consisted of bituminous concrete. The job was located in Athens County in southeastern Ohio, beginning about 2 miles south of the city of Athens where U. S. 50 meets U. S. 33. It extended south nearly 10 miles to the Meigs County line. The Fenton Construction Co. of Ashland, Ohio, was awarded the contract for the improvement on its low bid of $353,250. Work started April 1, 1948, and was finished by November 1.

The original road was only 16 feet wide, and was partly concreted, partly uncovered brick, and partly brick covered with a bituminous surface treatment. No matter what the surface, it was rough riding, broken up, and full of holes. Furthermore, the narrow pavement had more curves than a strip teaser—60 in 10 miles, or 6 to the mile.

Grading and Widening

First in the sequence of construction operations was the removal of some 15,000 linear feet of guardrail to make way for widening. The widening included not only the roadway, but also the drainage structures—there were 41 of these on the project, including a 20-foot-span bridge. Four channel changes were also involved.

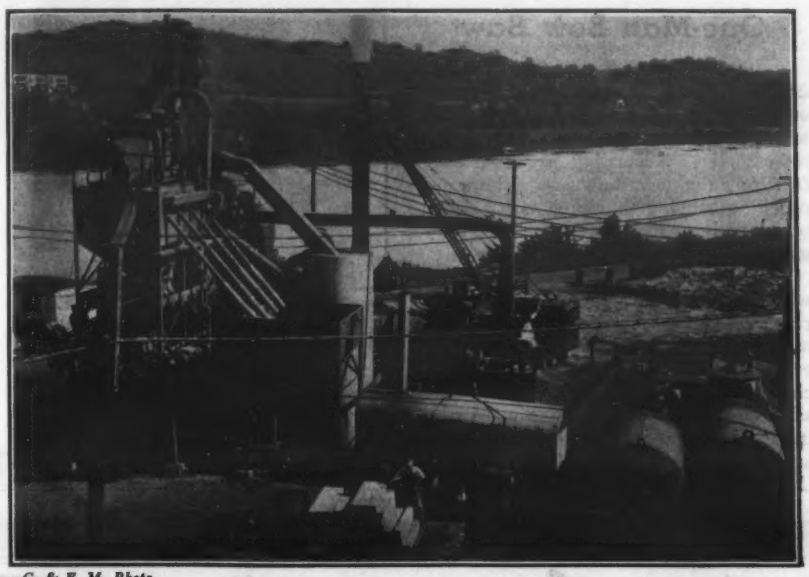
To increase the pavement width from 16 to 22 feet, or 3 feet to a side, a Buckeye ditcher was used to dig a trench 3½ feet wide and 7¼ inches deep. The bottom 1¼ inches of the cut was filled with an insulation course of limestone screenings. On top of that went two 3-inch courses of plant-mix laid with a shop-made spreader box. Five Galion 4-ton trench rollers compacted each course as it was placed. The bituminous concrete put into the widening was the same mix as that used later in the surfacing. While the widening base was 3½ feet in width, the additional widening of the surface extended out only 3 feet beyond the edges of the original pavement.

Long Haul

The asphalt plant for the hot-mix was set up south of the project in Pomeroy on the Ohio River. This location entailed an average 22-mile haul with the bituminous concrete from plant to road, but to offset the long haul, low-priced aggregate for the mix was readily obtainable from the Ohio River. The Ohio also served as a broad highway from the banks, where the sand and gravel were dredged, directly to the asphalt plant. The Ohio River Sand & Gravel Co. supplied both the fine and coarse aggregate for the mix. Dredges working upstream at Letart, Ohio, dug out the aggregate, which was then barged to the plant site at Pomeroy. The plant was located on the Ohio bank of the river in the shadow of the bridge crossing the Ohio to Mason, W. Va.

When an aggregate barge tied up at the bank, a derrick on the barge equipped with a 2-yard clamshell bucket unloaded the material into a hopper bin on the shore. From the bin the sand and gravel, one at a time, dropped onto conveyors which moved the aggregate up to the plant. The conveyor system included first a long 120-foot belt, then two 60-footers, and at the end a 20-foot belt. The final short conveyor was readily swung around to build up stockpiles of either material. Barricades of old, obsolete steel road forms were built around the sand and gravel piles. Some forms were stuck 4 feet into the ground to serve as posts, while others were erected between them as a fence.

(*Continued on next page*)



C. & E. M. Photo
This Metherington & Berner asphalt plant, set up on the bank of the Ohio River, produced the hot-mix for Fenton Construction Co.'s widening and surfacing job.

Asphalt with an 85-100 penetration for the mix, and the fuel oil used at the plant, were supplied by the Ashland Oil & Refining Co. of Ashland, Ky., 70 miles away. Transport trucks delivered both products. At the plant a portable Kinney 3-inch asphalt pump, driven by a Ford Model A engine, unloaded the big trailers into two 10,000-gallon horizontal asphalt tanks. The fuel oil was stored in an 8,000-gallon tank.

Asphalt Plant

The contractor's Hetherington & Berner asphalt plant mixed 1¾-ton batches in its pugmill which had a capacity of 65 tons an hour. Because of the wet nature of the river sand and gravel—the sand had a moisture content of around 8 per cent, and the gravel 5½ per cent—the plant was operated at less than top speed in order to dry the aggregate thoroughly before mixing it with the bitumen. The average output was 56 tons per hour for a 10-hour day.

At the stockpiles a General crane with a 45-foot boom and an Owen ¾-yard clamshell bucket loaded the aggregate into a 20-ton compartment bin. From a hopper in the bottom of the bin the material dropped onto a Jeffrey-Traylor vibrating feeder which moved it along to a 30-foot cold elevator. At the top of the elevator the aggregate passed through a 30-foot-long x 6-foot-diameter drier heated by two Hopkins burners. The hot material then ascended a 44-foot enclosed hot elevator and spilled out over a Deister 48 x 83-inch flat vibrating screen with 4 decks.

Screen openings from top to bottom were, respectively: 1-inch, ½-inch, ⅜-inch, and No. 4, for the three divisions of gravel and the sand. The aggregate was collected below into four bins, each holding 10 tons. From the bins the material dropped into a weigh bucket equipped with Kron dial scales, and then into the 1¾-ton pugmill. The asphalt was brought to the pugmill through a 4-inch steam-jacketed line, part of the Fluidometer system, with the circulation provided by a Viking pump. The temperature of the asphalt was around 260 degrees F when it entered the pugmill, while the stone ranged from 260 to 275 degrees F. Thus the hot-mix, when it was discharged by the steam-operated gates into the trucks, was around 265 degrees F. Steam for the plant was provided by a Cyclotherm steam-generator boiler heated by a single burner.

Dust Disposal

Because of its location within the boundaries of Pomeroy, the asphalt plant was fitted out with an efficient dust-collecting system. A Sturtevant 70-inch fan set up on top of the drier drew off the fumes and the fines into a barrel-type dust collector. The heavier material settled to the bottom, and then slid by gravity down a chute to the bottom of the hot elevator. There it joined the rest of the aggregate going up the hot elevator to the screens.

The very fine dust and fumes were pulled through the fan and into a silo-

(*Concluded on next page*)

C. & E. M. Photo

A Barber-Greene Finisher puts a pre-leveling course down on U. S. 33 in Athens County, Ohio. A Buffalo-Springfield 10 to 12-ton 3-wheel roller brings up the rear.

A Hot-Mix Surface For Widened Highway

(*Continued from preceding page*)

like tank 10 feet in diameter and 30 feet high, into which the dead steam lines from the plant were admitted. In the middle of the tank was a vertical baffle plate. As the fines entered the tank they were hit by the steam and forced to the bottom of the silo. There they piled up, and once a week were shoveled out. The smoke fumes, containing a negligible amount of fines, passed out the smokestack on the plant.

Electric Operation

A system of electric motors operated the asphalt plant, with power furnished by the Ohio Power Co. A 440-volt line close to the bridge was tapped and stepped down with a transformer to 220 volts for running the various ac motors. The principal motors with their horsepower ratings are as follows:

Cold elevator	7½ hp
Feeder	5 hp
Drier	50 hp
Hot elevator	10 hp
Screens	7½ hp
Fan, 70-inch	50 hp
Pugmill	75 hp
Oil pump	1½ hp
Asphalt pump	10 hp

A 1¾-ton batch of the hot-mix by weight and percentage was as follows:

Material	Weight	Percentage
Asphalt, 85-100 penetration	203 lbs.	5.8
Sand, No. 4 to No. 200	1,302 lbs.	37.2
Gravel, 1-inch to No. 4	1,995 lbs.	57.0
Total	3,500 lbs.	100.0

A crew of four operated the plant, including Harry Wilson, Plant Superintendent; Richard Foster, Assistant Plant Superintendent and mixer operator; drier operator; and crane operator.

Overflow material from the bins in the plant tower was chuted down to a storage bin at the side where it was collected and returned at intervals to the stockpiles.

The plant-mix was hauled to the road in a fleet of as many as 20 trucks holding an average of 7 tons. They were hired on a ton-mile haul basis. They entered the plant area on the downstream side of the bridge, backed under the tower for a load, were covered with tarpaulins to retain the heat on the long 22-mile haul, and then went up a ramp to the highway on the upstream side of the bridge. Their steel bodies were insulated with Celotex as a heat retainer along the sides and also under the floor. The bodies were sprayed with fuel oil after every round trip which took about two hours.

Laying the Mix

Paving operations began on June 25, after the widening was completed. Three courses were laid by a Barber-Greene Finisher and compacted by two Buffalo-Springfield rollers—first a 12-ton 3-wheeler and next an 8 to 12-ton tandem roller. A scratch or pre-leveling course was put on first in two 11-foot lanes. This course varied in depth from 3 inches compacted down to the thickness of a single stone. Its purpose was to fill in some of the worst dips or low places in the old road, reduce the old high crown, remove some of the excessive wrinkling, and to superelevate the sharp curves.

This was followed by a leveling course of 1-inch minimum thickness and laid in 10½ and 11½-foot lanes in order to break the joint at the center line. The top or surface course was 1¼ inches in depth, and was laid in two 11-foot lanes. The same mix was used for all three courses, and all the material was laid by the one finisher.

Work started at the north end of the project, and proceeded towards the plant so as to keep the trucks from running over the newly laid pavement. The surface course was kept up with the bottom courses, so that not more than 10 days intervened after the leveling course was laid before the top course was finished. This procedure made for a good bond between the courses. The two lanes on each side of the road were also matched up every other day. Traffic was maintained during all the paving work. The paving crew consisted of a finisher operator, screed man, 2 rakers, 2 laborers, and 2 roller operators.

When the paving was completed, 5-foot shoulders were built along each edge, and the guardrail was reset in position.

Quantities and Personnel

The major items of the contract consisted of the three courses of asphaltic-concrete paving:

Leveling course	21,565 tons
Base course	6,112 tons
Surface course	8,708 tons
Total	36,385 tons

For the Fenton Construction Co., Walter Wait was Superintendent and Edgar Sarver was General Manager.

For the Ohio Department of Highways, Walter F. Douglas was Project Engineer. The job was located in the Marietta Division of which C. A. Ferguson is Division Engineer. The Department is headed by Theodore J. Kauer, Director of Highways, with S. O. Linzell, Assistant Director. Louis Wismar is Chief Engineer of Construction.

Light Dragline Buckets

A lightweight dragline bucket for levee work, clean-out, and rehandling operations is described in a folder available from Drake-Williams-Mount, 23rd and Hickory Sts., Omaha, Nebr. The company points out that the light construction of the Omaha LCR bucket enables it to increase load capacity without exerting greater weight on the dragline unit, or to increase digging radius without increasing the total load.

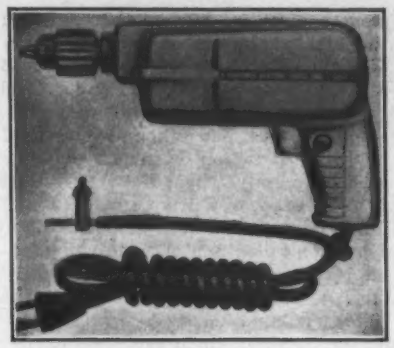
The catalog illustrates the construction features of the LCR, and shows other action photographs of it in the loading-and-dumping cycle. Features described in the catalog include the wedge shape, balanced design, high arch, rounded corners, and light weight. The catalog points out three factors to be considered in selecting a dragline bucket: its digging ability, length of life, and repair costs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 111.

Lightweight Drill

A portable electric drill featuring a palm-grip handle with a trigger switch has been announced by Portable Electric Tools, Inc., 255 W. 79th St., Chicago 20, Ill. Known as the Zephyr Model 1950, it has a full ¼-inch drill capacity. Power is provided by a fan-cooled universal 115-volt ac/dc motor, with other voltages available on request.

The Zephyr Model 1950 has a no-load speed of 1,600 rpm, a full-load speed of 900 rpm, an overall length of drill of 8⅛ inches, and a weight of drill of 3½ pounds. According to the manufacturer, the Model 1950 has a capacity in hardwood of ⅜ inch and a capacity in steel of ¼ inch. The housing, handle, and gear case are made from die-cast aluminum. A built-in Cutler-Hammer trigger switch and rubber-covered cord and attachment plug are supplied with the tool.



This is the Zephyr Model 1950 ¼-inch portable electric drill. Notice its palm-grip handle and trigger switch.

Further information on the Zephyr Model 1950 may be secured from the company. Or use the Request Card at page 16. Circle No. 80.

Link-Belt Mgr. in Newark

Link-Belt Co. announces that John D. Riley has been named District Manager at Newark, N. J., to succeed George E. Ramsden, who died April 10, 1949. Mr. Riley, with the company since 1939, was previously District Sales Engineer at the Boston office.

Announcement is also made that the Newark office has moved to larger quarters at 212 Essex Bldg., 31 Clinton St., Newark, N. J.

Heavy Truck Line Introduced by GMC

An advanced line of all-new heavy-duty models has been introduced by GMC Truck & Coach Division of the General Motors Corp., Pontiac, Mich. There will be 61 basic gasoline and diesel models in the new H line. The gross vehicle weights will range from 19,000 to 75,000 pounds, and gross combination weights will range up to more than 90,000 pounds for vehicles used in off-the-highway operation.

The new models, says GMC, cover the diversified needs of heavy haulers to a more complete degree than any previous line. Many new special models have been added to the line to meet the requirements of certain specialized hauling operations. There are high-speed tractors for fast hauls. In addition, there are new gasoline and diesel six-wheelers for concrete mix and other heavy jobs. For operators in states with truck-length limitations, GMC offers a new high-powered 900 Series with the distance from bumper to back of cab shortened by about 1½ feet.

Foremost of the advancements featured by the heavy-duty line are five new gasoline engines, including a big new power plant with a piston displacement of 707 cubic inches, providing gasoline power for models heretofore exclusively diesel. All have greater horsepower than previous GMC engines, due to an increase in compression ratios from 6 to 1 to 6.5 to 1.

Larger radiator cores and higher-capacity water pumps have improved the engine cooling system. The radiators have an in-built surge tank and the cooling system is pressurized to keep it sealed against the air; this prevents boiling at high temperatures and practically eliminates radiator refilling, the company points out.

The diesel line highlights the improved 4-47 and 6-71 GM diesels which develop 135 and 200 horsepower respectively, plus a big 300-hp model which is now in the development and test stage.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 124.

Plastic Plywood for Forms

Plastic-faced plywood for concrete forms is described in a 4-page folder issued by the Georgia-Pacific Plywood & Lumber Co., 350 Fifth Ave., New York 1, N. Y. The folder lists several features claimed for GPX, including extra-smooth surfaces, minimum of refinishing, quick stripping, immediate re-use, low maintenance cost, and long life. These plywood panels are faced with a phenolic resin said to yield a smooth, glossy surface which is practically impervious to moisture, is highly abrasion-resistant, and virtually eliminates checking and grain raise.

The catalog lists the specifications for this material, describing the type of wood used, the type and quantity of plastic applied, sizes in which it is available, and freight rates and classification. The catalog contains hints on the proper handling of this material, and also photographs of several projects on which the GPX panels were used.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 70.

PCA Consolidates Offices

The Portland Cement Association district offices in Dallas and Austin, Texas, have been consolidated into a single district office located in Austin. James D. Piper, formerly the Association's District Highway Engineer in Dallas, has been appointed District Engineer in charge of all Association work in Texas. Charles A. Clark will continue with the Association as Office Engineer in the newly consolidated Austin office.

St. Louis' Eads Bridge Marks Diamond Jubilee

Opened 75 Years Ago This Month. The Famous Span Still Does Yeoman Service; It Was Built Despite Floods, Tornadoes, and River Men

✦ ON July 4, one of the most photographed and painted structures in the world celebrated the diamond jubilee anniversary of its grand opening—The St. Louis Bridge, better known now as Eads Bridge after its designer, Captain James Buchanan Eads. Though only the most farsighted realized it at the time, this bridge was destined to make St. Louis one of the greatest railroad gateways of America.

Many are the tales told about the building of the great span, but none is better than Eads' reply to his assistant who was coping with the excessive expansion of the bridge steel in hot weather. When the first, or western, arch was to be closed, it was discovered that its two ends overlapped. Seeking advice, Eads' assistant, Henry Flab, cabled his chief, who was in England on business. Back came the reply:

"Pack the damn thing in ice; any darn fool would know that."

The story behind the building of this first bridge to span the Mississippi River at St. Louis is one of pioneering engineers, men with "no little ideas", and of a long, heartbreaking series of unexpected difficulties which would have discouraged less hardy men.

When the Illinois & St. Louis Bridge Co. was chartered by the Missouri Legislature in 1867, Eads, a native of Indiana, a citizen of St. Louis, and nationally famous for his river work and gunboat building, was given the post of Chief Engineer for the project and commissioned to design the proposed bridge. The finished structure, with its three supporting arches and with no superstructure above the roadway, is just as Eads conceived it. This was one of the achievements which won for Eads, who as a boy sold apples on the streets of St. Louis, the coveted Albert Medal in 1884 from the Council of the Society of Arts in England "for services he had rendered to the science of engineering".

First Idea

Probably the first suggestion of a bridge at St. Louis came in August, 1839, from Charles Ellet, Jr., in a letter to Mayor William Carr Lane. Ellet's bridge was to cost $737,566, about a tenth of what Eads Bridge eventually cost, but Mayor Lane dropped the matter by saying, "The time is inauspicious for the commencement of an enterprise involving such an enormous expenditure of money."

The next bridge attempt, several years later, was that of Joseph Dent, a St. Louisan. His span was to have a clearance of 90 feet above high water to appease the steamboat interests. The cost was to be about $1,500,000, but the expected backing was not obtained from railroad interests and the plan was abandoned.

About this time John A. Roebling, who had built the Niagara Bridge, submitted plans for a long-span suspension bridge over the Mississippi at St. Louis, but nothing definite was done on it. The City Engineer of St. Louis, Truman J. Homer, submitted a plan for a tubular bridge at a cost of $3,332,000. But the plan was almost still-born and nothing was accomplished.

The Eads Bridge really had its birth in the 1864 formation of the Illinois & St. Louis Bridge Co., which was fought fiercely but in vain by several ferry companies. On May 1, 1867, when Eads was appointed Chief Engineer for the bridge, he immediately employed Col. Henry Flad as his first Assistant Engineer. (Both men are memorialized in streets bearing their names in South St. Louis; Eads and Flad Avenues are only a few short blocks apart.) Within two months of his appointment, Eads submitted to the bridge-company directors his plans for the bridge, giving the length of the spans and his intention of using steel tubular arches and constructing the stone piers to bedrock.

Problems and More Problems

Vexing problems presented themselves the very first day of construction. For more than 60 years the location of the west abutment had been a steamboat wharf, and during that time tons of useless material had accumulated. In the memorable fire of 1849, when 29 steamboats were burned there, two of them had sunk—one on top of the other—on the abutment site. There was also about 12 feet of debris, consisting of old grate bars, fire brick, smoke stacks, stone clinkers, and other articles used in the construction of steamboats.

Consequently when the first wall of the cofferdam was driven, it was found that part of it had been stopped by the 4-inch oak planking of a hull; that another part was driven around the driving rod, enclosing the boat within the cofferdam, and the paddle wheel was on the outside. Such problems caused many and costly delays but Eads, Flad, and their colleagues fought slowly ahead.

On March 8, 1871, another temporary setback was suffered when a tornado struck the east bank of the river with terrific force and caused $50,000 worth of damage to the machinery set up there to sink the foundation for the east abutment.

The decision to base the piers on solid rock led to further difficulties. The east abutment foundation was sunk 110 feet below the surface of the river. For men to work at such depths, pressure chambers had to be used. Short shifts were ordered—no man could stay down more than 2 hours—and the men were told to eat hearty meals before entering the work chamber.

Physicians studied the effects of the abnormal pressure on the workmen almost daily, supervised by Eads' own physician, Dr. Jaminet, through whose

(*Continued on next page*)

fine work the dread seizure was abated. Most workers felt no ill effects, but some couldn't stand it. More than a score of the hundreds of men working on the bridge were killed, the largest number from results of excessive pressure under the river.

The ferry companies, which had hitherto monopolized river traffic, realized when they saw the bridge actually under construction that their business was being seriously threatened. Using their influence with the Secretary of War, the river men succeeded in having the bridge condemned as "interfering with navigation"; they claimed that the smokestacks of river steamboats could not clear the bridge.

But the ferry people had counted without the determination of Captain Eads and Dr. William Taussig, one of St. Louis' leading citizens and chairman of the bridge company's executive committee. The two men hurried to Washington and laid the case directly before President Grant.

"Has this project been approved by the Government of the United States?" Grant asked. The Secretary was compelled to admit that it had been. "Then it is not possible to condemn it unless Congress is willing to undertake to pay the costs. It will not be necessary to show me the papers. Have the condemning order rescinded immediately."

Bridge Tunnel

In 1870, to eliminate the inconvenience of routing trains through the city streets, a tunnel was built in connection with Eads Bridge. This, too, was a spectacular piece of engineering for that day. Streets were excavated from curb to curb. Massive side walls of masonry were laid; a double track was set in with a wall between and spanned by heavy brick arches strong enough to support the thoroughfares above and their traffic. The tunnel is almost a mile long, running under St. Louis' Washington Avenue to Eighth Street, then south on Eighth to Poplar, terminating near Union Station.

Sidewalk Supervisors

Spectators always had plenty to watch as Eads Bridge was constructed. During the work a temporary superstructure was erected. Movable towers were built on the piers and abutments, and cables were strung from them to support the arches as they grew out from each side.

These were lengthened and balanced according to the changing lengths of the growing arches and the stress they put on towers and cables. The general technique of construction was to fabricate small sections of the spans on shore and hoist them into place from river barges below.

In the spring of 1868, Eads' physician ordered him to take a vacation in Europe for his health, and Flad was placed in full charge of construction pending the Chief Engineer's return.

During Eads' sojourn in Europe he visited France and was invited to inspect the famous bridge then under construction at Vichy. As a result of his inspection trip, Eads completely changed his plans for the piers on the St. Louis Bridge. He decided to use the general method used at Vichy, although with important modifications and on a larger scale. Eads returned from Europe in April, 1869, his health regained, and in a month's time 1,000 men were working on the east pier. By September 1 this was increased to 1,500. Finally on February 28, 1870, booming cannon and shrieking whistles announced to the City of St. Louis that the hardest problem of the bridge's construction had been solved—the caisson of 437½ tons had reached bedrock in the river at 93½ feet.

More Disputes

Building of the superstructure was beset with a multitude of disputes between the contractor, Keystone Bridge Co., the various subcontractors, and the bridge company over the rigid specifications. Securing the desired quality of steel was troublesome and the machinery continually broke down. But although the winter of 1873-74 was extremely cold, the work on the bridge was carried on with little delay.

The upper roadway was finished April 15, 1874, and on Saturday, April 18, the contractor agreed to allow it to be opened to the public. A few hours later, however, he suddenly withdrew his consent to deliver the bridge until he was paid money due him.

This dispute reached its height just when the 10-year goal of completion was in sight. However, a compromise was eventually reached to open the bridge to foot-passengers on Eads' 54th birthday, May 23, 1874.

The first few days in June saw the completion of the east approach on the East St. Louis side and the tunnel under St. Louis' downtown section. The railway tracks were laid to within a few feet of what is now the Relay House in East St. Louis, and one summer afternoon a party of engineers and invited guests helped to connect the rails of the bridge with the rails on the land.

On July 2-4, 1874, the city celebrated the completion of the bridge in magnificent style, adapting the usual festivities of Independence Day to the event. Subsequently a conclusive and exhaustive series of demonstrations of the strength of the bridge were given when 14 locomotives and their tenders were run across it at once and then stopped on it. The total weight carried was varied on later trips to stamp the span as No. 1 in reliability.

The vital importance of the Eads Bridge can be seen immediately when it is noted that 2,000 freight cars and 24 passenger trains now make daily use of the span. In the course of one year, something like $4,000,000,000 worth of goods and materials flow through the St. Louis Eads Bridge gateway.

Some Pertinent Figures

The grand total cost of construction and erection of the Eads Bridge was $6,536,729.99—almost $6,000,000 more than Charles Ellet had estimated for his proposed bridge and more than twice

(*Concluded on next page*)

Eads Bridge Marks Its Diamond Jubilee

(*Continued from preceding page*)

the figure Eads had estimated. It might be noted right here that estimates and actual costs of construction were as far apart 80 years ago as they are now.

A few figures regarding costs and quantities of materials in Eads Bridge are interesting, if only to compare with present-day expenses of such projects when even a U. S. Navy super-carrier costs about $180,000,000. Total cost of the superstructure of Eads Bridge was $2,122,781, including $1,410,000 for iron and steel, $36,907 for timber, $177,620 for erection, $43,000 for painting, and $35,000 for testing.

The total amount of steel in the bridge is 4,780,000 pounds, along with 6,313,000 pounds of iron, 1,612,000 pounds of wood, and 430,000 pounds of railway tracks. Total weight of the three arches is 13,135,500 pounds, or about 6,588 tons (an average of 4.3 tons per foot). The weight per foot at the center of the span is only about one-half of the weight at the ends.

The bridge is 1,627 feet long between abutments and consists of three arches of steel, the center 55 feet above water and the two side arches 50 feet above high water. Each of the arches is curved to a radius of 742 feet; the rise of the center arch is 47 feet and that of either side span is 43 feet 8 inches. At the time the plans were made for the bridge no precedent existed for such a monumental task.

The first job of general replacement of materials on the bridge was undertaken in 1946-47 when its furnishings, including the light standards, wheel guards, railings, and toll house, were replaced with new fixtures. In 1903, the railroad deck was reinforced in anticipation of heavier locomotives, but there was no substitution of new steel for old until the 1946-47 job. The roadway was widened at the expense of the sidewalks, too. The new deck was made of concrete-filled I-Beam-Lok flooring and the traffic capacity was increased. As a result of the changes, the total dead load of the bridge was reduced about 800 pounds per linear foot.

Engineers versed in bridge building estimate roughly that it would cost about $15,000,000 to do a similar construction job now, and this is a conservative guess. Although buffeted by everything from a slight 40-mile-an-hour wind to cyclones and tornadoes in its 75 years, the bridge has taken it all in stride. The 1896 cyclone in St. Louis, which was so catastrophic that oldsters still use it as a date mark, took off a top of the bridge's east arcade and threw a piece of wooden timber through one of its steel beams (the beam is now in the Missouri Historical Society Museum). But this was "small potatoes" to such a sturdy structure. The famous tornado of 1927, which ripped through St. Louis like a bull in a china shop, brought nary a wrinkle to Eads Bridge.

Eads Bridge—started in 1867, completed in 1874—was the first one across the Mississippi River at St. Louis. It is built of steel tubular arches and stone piers constructed to bedrock. Cost of construction and erection was $6,536,729.

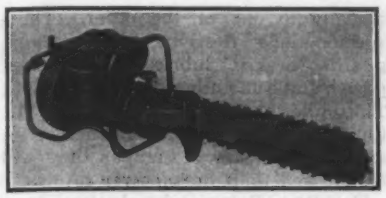
Wonder of Its Time

The Eads Bridge is known throughout the engineering world as an outstanding example of skill and daring. Its reputation and fame seem well deserved when we consider that now, 75 years after its completion, it is still doing a yeoman's service, carrying hundreds of thousands of railroad cars across the Mississippi.

Decades ahead of its time, Eads Bridge was not only the first to use steel extensively, but was the first to use hollow chord members and the first to use pneumatic caissons for large bridge piers. The graceful arches in themselves were wonders of the time.

Edward W. Botten Dies

Edward W. Botten, associated for many years with the Owen Bucket Co. of Cleveland, Ohio, died recently. At the time of his death he was Secretary-Treasurer and Sales Manager.



The new Lombard 19-inch one-man chain saw weighs 38 pounds and is powered by a 4-hp gasoline engine.

A 19-Inch Chain Saw

A 19-inch one-man chain saw is announced by the Lombard Governor Corp., Ashland, Mass. It is powered by a 4-hp gasoline engine and weighs 38 pounds. The cutter bar swivels to any desired position, the manufacturer states, and the handle bars and controls have been designed to promote ease of handling. The saw is recommended by the company for both felling and bucking.

The new Lombard saw is equipped with a Warren high-speed chain. Several features are claimed for this type of chain: the thickness of the chip removed by the cutter teeth is controlled by a series of depth gages; the special plow-shaped teeth cut unusually fast; and the use of special alloy steel reduces the frequency of teeth sharpenings. According to Lombard, these teeth can be used upwards of 60 hours without dulling.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 85.

Reversible Wrenches

A heavy-duty reversible ratchet wrench is announced by Greene, Tweed & Co., North Wales, Pa. The total leverage which the wrench exerts through the handle is wholly applied to the work, the manufacturer states, and the danger of pawl breakage is entirely obviated. All working parts are said to be put in compression by applied strains or loads.

A special feature of construction is the use of a synthetic-rubber ring to retain the socket in position. This ring will not work loose, the company points out, yet it can be easily snapped on or off for interchange of heads, without special tools. The pawl is of a one-piece design and has been built into and bolted through the wrench handle. The manufacturer reports that the pawl and socket teeth have been angle-set for sure clutch fit.

The Favorite Deluxe model has a double head to permit the use of two different sizes of nuts; a positive straight-ahead ratchet movement to eliminate lift-off at quarter turns and permit easy operation in close quarters; and free opening through the head socket to permit the wrench to be used over long studs. The unit is available with 15, 24, and 27-inch-long handles, and with sockets to accommodate nuts from ¼ to 1½-inch bolt sizes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 92.

Altimeters for Surveyors

Sensitive altimeters for surveyors are described in a catalog prepared by Wallace & Tiernan Products, Inc., Belleville 9, N. J. The W&T altimeters are made in two basic types, each of which is treated fully. The folder also describes the new shock-proofing metal case, and the standard leather carrying case with shoulder strap.

Folder TP24A covers in detail the features of both types of altimeter, their construction, method of operation, and uses. Phantom-type photographs show their mechanisms and specifications cover scale length, dial size, sensitivity, and accuracy. Information is also presented on the standard and special ranges, graduations, built-in armored thermometer, and effect of temperature changes.

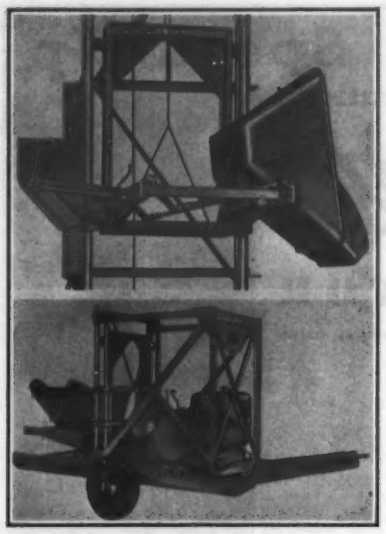
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 48.

Lightweight Engine

A vertical-shaft-type gasoline engine rated at 1½ to 1¾ hp is announced by the Clinton Machine Co., Clinton, Mich. The VS-700 weighs 35 pounds, and is described as a 4-cycle extra-heavy-duty full-carburetor-equipped engine. Among the features cited for it are needle bearings as main bearings, extra-heavy spring-loaded oil seals, and an adjustable air-velocity governor.

Quick starting and smooth running are insured, says Clinton, by a dust-proof, waterproof, and high-voltage-output ignition system. The splash-type lubrication features an oil-distributing system in which the oil level is below the moving parts.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 16.



Two new accessories for the Jaeger self-raising hoist tower: a ½-cubic-yard concrete bucket, and a trailer-transporter designed to carry the base section and engine-driven hoist of the tower.

Two New Accessories For Hoisting Tower

Two accessories for use with its self-raising hoist tower are announced by The Jaeger Machine Co., 701 Dublin Ave., Columbus 16, Ohio. They are a new ½-cubic-yard concrete bucket and a trailer-type transporter.

The Jaeger concrete bucket is interchangeable with the 5-foot 6-inch x 5-foot 9-inch material platform which is standard equipment for the tower. According to the manufacturer, it fits on the same frame and can be easily adapted to towers now in service. The bucket is of the roll-over type and will hold the full load of an 11-S mixer. It descends to a low level to permit loading directly from concrete mixers at ground level, or from truck-mixers. Bucket discharge is automatic, and discharging levels may be regulated in 3-inch increments at any point from 10 feet above the ground to within 5 feet 6 inches of the top of the tower. The standard tower height of 37 feet can be increased by extensions to 67 feet. A positive-acting safety device prevents the material platform or concrete bucket from falling, the manufacturer states.

The trailer-transporter is designed to carry the largest section of the Jaeger self-raising tower—the base section and engine-driven hoist. The upper tower sections and braces can be carried by truck or other hauling unit. To mount the tower, the wheel-and-axle assembly is rolled under the sled-runner base of the tower and bolted securely by means of U-clamps. The structural-steel towshaft bolts to these same runners, at an angle said to permit easy hitching and level towing. The trailer is mounted on heavy-duty automotive-type 6-ply 5:00 x 16 tires. The wheels are equipped with Timken bearings.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 87.

Shifts in Sales Staff Made by Caterpillar

Realignment and expansion of the General Sales Department has been announced by the Caterpillar Tractor Co., Peoria, Ill. In the new sales set-up, H. H. Howard, General Sales Manager, assumes the title of Director of Sales, with J. J. Valentine and J. H. Mohler named as Assistant Directors. Valentine, heretofore Assistant General Sales Manager, will have administration of Eastern, Central, Western, and Governmental Sales Divisions. Mohler, formerly Manager of Sales Training Division, will now administer Sales Development Division and Sales Training Division along with two newly created divisions, Sales Engineering and Market Research.

W. N. Foster, Assistant Eastern Division Sales Manager, becomes Manager of the new Sales Engineering Division, while L. J. Deyo, former assistant to J. J. Valentine, heads up the Market Research group.

K. F. Ames will succeed Mohler as Sales Training Division Manager and will be succeeded as Assistant Manager of Central Sales Division by J. M. Abbey, formerly a district representative of the Central Division. Foster will be succeeded as Assistant Eastern Division Sales Manager by C. K. McClelland, formerly a district representative in the Central Division.

Scraper, Cableway Hoists

Hoists for scrapers and cableways are described in a 16-page catalog issued by Sauerman Bros., Inc., 522 S. Clinton St., Chicago, Ill. These units are available with electric, gasoline, or diesel power units, or for use with belt drives. The catalog features a general description of the Sauerman hoists, explaining how they are especially adapted for use with scraper and cableway machinery. It explains fully the various methods of hoist control which are available, including manual control, remote manual control, hydraulic control, remote electric control, and air control.

Specifications cover details about the hoists which are common to both types of operation—also, those applying specifically to one or the other. These specifications describe the castings, guards, brakes, lubrication, clutches, power units, and other component parts. The bulletin, Section N of Catalog 19, illustrates typical models in each series and lists the size of scraper they will handle and their horsepower ratings.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 118.

ARBA Holds Regional Meeting in Southeast

Highway Needs Relating to Nation's Safety, Economy, and Security Are Discussed at Georgia Conference

+ REGIONAL meetings received a big boost at the Southeastern States Conference sponsored by the American Road Builders' Association in Savannah, Ga., May 11-13. Over 250 attended, and many expressed their approval of this regional-conference tryout. They liked the compactness of the meetings, they said, and the fact that all sessions were held in one hotel, the General Oglethorpe. There was plenty of opportunity for getting around and talking things over between sessions, and for arm's-length discussions between the various facets of the highway industry and profession.

Discussions at the scheduled meetings covered the development and use of equipment in soils construction and maintenance, concrete construction and maintenance, and bituminous construction and maintenance. Business sessions included those of the executive committees of the ARBA, and the various ARBA divisions—the Manufacturers', Contractors', County Highway Officials', and Municipal Divisions.

Throughout the conference—and in two 15-minute radio programs arranged by the ARBA public-relations department—speakers stressed the need for an expanded national highway program in relation to the country's security, economy, and safety.

Traffic Congestion

Col. Enoch R. Needles, President of the ARBA, pointed out that since the war, 10,000,000 new motor vehicles have been registered, and since 1930, our population has increased 25,000,000. "These things," he said, "call for additional living space which, under the American concept of the automobile as a necessity rather than the luxury it once was, means additional traveling space. . . .

"Traffic congestion is a disease that can be cured only through public realization that the malady is menacing the cores of American cities and threatening our whole urban organism with irreparable economic losses. An important ingredient of the cure is a stepped-up highway program to provide facilities commensurate with ever-growing population and traffic demands."

$47,000,000,000 Program

Expenditure of $47,000,000,000 over a 10-year period—at a rate double that of the dollar-record 1948 pace—will be required to enable America's deficient roads to meet the nation's highway transportation needs, said J. S. Bright, Deputy Commissioner of the Public Roads Administration. The estimate, he said, was based on state-wide surveys made at the request of state legislatures or the executive departments of state governments.

Pointing out that "improvements made a quarter of a century ago, and now obsolete because of traffic growth, have long since paid for themselves," Mr. Bright called for "a better public understanding of the ratio between cost of highways and cost of highway transportation". Such understanding, he added, "would disclose that what appears to be a saving by restricting highway expenditures is being lost through excessive vehicle operating costs resulting from an overly-conservative highway program".

Showing that maintenance expenditures on state, county, and municipal highways rose from $393,000,000 in 1921 to $1,132,000,000 in 1948, the PRA official said: "We pay for our highways, whether we have them or not."

Road Program and the Economy

R. K. Stiles, President of the Manufacturers' Division of the ARBA, made the assertion: "As the construction industry goes, so goes the nation, prosperity-wise." Mr. Stiles envisioned a highway program that would help stabilize our national economy and at the same time help compensate for wartime deterioration of the nation's roads. "Every dollar spent on highway development," he said, "results in three dollars worth of business. For every investment of $100,000,000 in highway contracts, business worth $315,000,000 immediately results in outlays for such items as material, equipment, labor, and services."

Nello J. Teer, Jr., President of the Contractors' Division, urged a long-range far-sighted highway construction program, to be announced by the various states and their subdivisions, and to be based on Federal aid of "known amounts projected several years into the future". Such a program would save taxpayers millions, he said. It would enable highway men to invest in expensive equipment with some assurance, and to hire and retain com-

(*Concluded on next page*)

ARBA Holds Regional Meeting in Southwest

(*Continued from preceding page*)

petent staffs. It would also safeguard the country "against the unplanned type of public works so prevalent in the last depression".

One Great Obstacle

Pressing though the need is for highway construction, one of the greatest obstacles to the work is the shortage of highway engineers, said Hal H. Hale, Executive Secretary of the American Association of State Highway Officials. "Only one of every 172 full-time engineering students enrolled in colleges and universities this year indicated an interest in state highway departments or the Public Roads Administration," Mr. Hale announced. Low salaries and slow advancement are the causes.

"One of the largest businesses in the United States is highway transportation, yet the incentive to highway engineers is so low, graduates feel they can make more money at common labor." Though many states have approved salary and wage increases—some substantial, some merely gestures—"long strides are still to be taken by most states," said Mr. Hale, "to place highway departments on a competitive basis with private industry."

Utility Gas Engine

A new model of gasoline engine rated at 16 hp is announced by the International Harvester Co., Industrial Power Division, 180 N. Michigan Ave., Chicago 1, Ill. It is suitable for powering generators, oil or water pumps, auxiliary equipment, and other uses in its horsepower range. The Model U-1 can be supplied as a stripped engine, or as a complete power unit with job-engineered attachments. It can also be supplied in a model which operates on natural gas.

Stripped, the U-1 is said to deliver a maximum of 16.3 brake horsepower at 2,500 rpm. According to the manufacturer, it develops a maximum of 16 working horsepower when equipped with fan, radiator, and air cleaner. The engine is 26 13/32 inches in length, 16 11/32 inches in width, and 25 inches in height. The stripped engine weighs approximately 280 pounds; the complete power unit, 450 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 42.

Essick Buys Into Smith

Man bites dog—or business moves eastward. In the past, large eastern companies desiring to expand have taken over, or bought into, successful west-coast companies. But now the Essick Mfg. Co. of Los Angeles comes up with the news that it has acquired a substantial block of common stock in the T. L. Smith Co. of Milwaukee, Wis.

Bryant Essick, President of the company bearing his name, has been elected a Director of the T. L. Smith Co., but will be active only in an advisory capacity and as a member of the Board. No change is contemplated in the management or policies of either company, although there will be a unification of sales efforts for the non-competitive equipment manufactured by both companies.

Data on Rock-Boring Unit

A rock and earth-boring trench-type machine is described in a catalog issued by The Salem Tool Co., 769 S. Ellsworth Ave., Salem, Ohio. Both horizontal and vertical types of the McCarthy machine are described, and so are its principal parts, the 25 or 32-hp Wisconsin gasoline engine, heavy-duty truck-type transmission, main-drive case, carriage and main frame, hydraulic unit, and elevating jacks.

The catalog contains several photographs of the self-propelled truck-mounted machine in use on a variety of jobs. It describes its features, the uses to which it is best suited, and its performance.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 50.

Aggregate-Feeding Data

"Feeds and Feeding", a new illustrated 6-page booklet put out by Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn., discusses recommended practices for the systematic feeding of aggregates in crushing and screening operations. The text is in three parts—feeding of coarse material, feeding of graded material, and feeding of mixed materials.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 130.

Old Road Is Graded, Paved With Concrete

Numerous Sinkholes Are Excavated and Structures Built to Handle Drainage Along New Location

✦ THE State Highway Commission of Indiana has recently reconstructed a 3.38-mile section of State Route 135 just north of Corydon, county seat of Harrison County, in the southern part of the state. State Route 135 is a well traveled road running from Indianapolis, in about the center of the state, south to the Ohio River, a distance of some 150 miles. It is generally called the Old State Road, for Corydon was the first state capital from 1816 to 1825.

This 3.38-mile stretch had an oil-mat surface, put down nearly 20 years ago, with a width of from 16 to 18 feet. Besides being too narrow for present-day traffic, it was marked by sharp curves, both horizontal and vertical. The new work began at the intersection of State Route 337 outside of Corydon, and went north to the intersection of State Route 335. Most of the project was on new location, paralleling the tracks of the Louisville, New Albany & Corydon Railroad.

A contract for the grading, construction of drainage structures, and the laying of a 22-foot reinforced-concrete pavement on this section was awarded by the State Highway Commission to the Calumet Paving Co. of Indianapolis in December, 1947. Work on the project got under way in March, 1948. Paving began on October 8 and was completed November 2, 1948. The new highway cost approximately $350,000.

Sinkholes

This entire region is well known because of the numerous sinkholes dotting the countryside, which has a stratum of limestone underlying the surface of the ground at varying depths. The locations of these sinkholes were, of course, clearly evident, and they were marked on the job plans. But their depth and size could not be completely ascertained until they were opened up by dragline and investigated. Of the 19 sinkholes that were spotted along the new location, all but 3 were under the roadbed proper. Investigation revealed that they ranged in size from mere cracks or slits in the rock to virtual caves with depths of from 10 to 35 feet below surface.

All the holes were fully opened up for a thorough scrutiny. Two cranes—an Insley and a Michigan—with 30-foot booms and ½-yard clamshell buckets and draglines, excavated the sinkholes and the ground immediately around them to see how they drained and where they led. Three of the holes turned out to be only surface depressions, with no outlets deep into the earth, and so needed no further attention. Two other holes had no material effect on the adequate drainage of the road, and consequently these were sealed off with concrete and then backfilled.

But drainage structures were built over the opening found in each of the remaining 14 holes, which were then carefully backfilled with Grade B borrow and earth before the highway grading was completed. The vertical structures of reinforced concrete looked like chimneys set in holes in the ground. They were 2 feet square, had 6-inch walls, and were from 10 to 32 feet high. They were set on broad bases or caps of concrete from 7 to 10 feet square. Wooden forms for the structures were built in the holes, and concrete was mixed in a 2-bag mixer. A solid roof or cap was built on top of these chimney-like structures, but circular openings were left in the sides near the top for 15-inch concrete-pipe laterals under the fills. Storm and ground water flowed through the laterals, into the chimneys, and thence down through the ground.

Here are two views of the drainage structures which Calumet Paving Co. built in the sinkholes on its 3.38-mile grading and paving contract near Corydon, Ind. Form work is shown at the left, and at the right is the completed structure with a hole near the top for a connecting lateral.

Grading

The new grade is 44 feet wide, with 11-foot shoulders flanking the 22-foot pavement. The shoulders slope 1 inch to the foot, and beyond them is a 4-foot

(*Concluded on next page*)

Old Road Is Graded, Paved With Concrete

(*Continued from preceding page*)

slope, at the rate of 3 inches to the foot, to a rounded ditch in the cut sections. Backslopes vary from 2 to 1 to 4 to 1. In fill sections up to 5 feet in height, the slopes are 4 to 1, while above that height the slopes are 2 to 1. The maximum grade on the new highway is 4 per cent.

Nearly 20,000 cubic yards of solid rock was removed by blasting. Holes were drilled with Ingersoll-Rand and Cleveland wagon drills. The material was loaded by a Northwest 2½-yard shovel into Euclids—two 8-yard end-dumps and one 10-yard bottom-dump—for an average haul of 3,000 feet. The bulk of the grading along the roadway was handled by three tractor-scraper units—two Allis-Chalmers HD-19 tractors pulling LeTourneau FP 14 to 16-yard Carryalls, and a Caterpillar D8 tractor hooked to a similar Carryall. This equipment hauled up to 1,500 feet. Additional material needed for the fills came from borrow pits that were within 500 feet of the road. In general, the material was heavy clay with a mixture of small rocks.

The fills were spread in 9-inch lifts by an Allis-Chalmers HD-10 dozer, and an Adams motor grader leveled off the material. It was compacted by a Huber 10-ton 3-wheel roller. If necessary for compaction, water was added as the fills were placed, from a 500-gallon tank truck with a spraybar at the rear. Sinkholes supplied the water, which was pumped out by a Jaeger 2-inch pump carried on the tank truck. The 9-inch lift was aerated by a tandem disk harrow pulled by an International I-9 rubber-tired tractor. The harrow had 20-inch-diameter blades, 10 in front and 8 in the rear. It was also used to break up any large chunks of material before the rolling.

On an average, the three scrapers moved a total of approximately 3,000 yards of material in a 10-hour day. They were lubricated once a day by a truck-mounted grease rig.

Reinforced-Concrete Pavement

The concrete pavement was laid on a layer of subgrade-treatment material from 2½ inches thick at the center to 3 inches at the edges. The treatment was laid 24 feet wide, or a foot beyond the pavement on each side. The material was processed crushed stone from 1½ inches in size down to fines, and was supplied by the Corydon Crushed Stone & Lime Co. of Corydon, Ind., at the south end of the job. Hired trucks hauled the subgrade material to the road where it was leveled by the grader and compacted by the 10-ton 3-wheel roller, using water if necessary to compact.

A batch plant was set up along the highway at the center of the job on a siding of the Louisville, New Albany & Corydon Railroad. Bulk cement was shipped in cars from the Lehigh plant at Mitchell, Ind., and batched from a Blaw-Knox cement bin. The coarse and fine aggregate were batched from separate Blaw-Knox 75-ton bins. The stone bin was divided into two compartments for the two sizes of coarse aggregate furnished by the Corydon Crushed Stone Co. Sand from the Ohio River was supplied by the E. T. Slider Sand & Gravel Co. of New Albany, Ind. The wire-fabric reinforcing came from the Bethlehem Steel Co. at Chicago.

The 22-foot pavement has a 9-6-9-inch cross section, with the thickened edge taken up in a 2-foot transition. The pavement was poured full width, with a 1⅜-inch center crown and a 6-inch black traffic-lane stripe down the middle. Contraction joints were inserted at 40-foot intervals. They have ¾-inch x 24-inch smooth dowels on 12-inch centers across the slab for load transfer.

C. & E. M. Photo

An FP Carryall pulled by an HD-19 tractor dumps its load on a fill during grading operations on Indiana State Route 135.

Down the center of the pavement are ⅝-inch x 4-foot longitudinal tie bars on 5-foot centers. The wire-mesh fabric reinforcing lies 2 inches below the surface of the concrete.

Blaw-Knox forms—there were 6,000 linear feet of them on the job—were set 22 feet apart on the prepared subgrade. A Koehring 34-E dual-drum paver worked outside the forms on the 11-foot shoulder, mixing the batches which were hauled from the plant in trucks. Water for the mix was hauled from Corydon in tank trucks. As the concrete was dumped between the forms, it was leveled off by a Blaw-Knox spreader, which was followed by a Jaeger-Lakewood finishing machine and a Koehring Longitudinal Finisher. The concrete was cured with straw and water.

Quantities and Personnel

The major items in the 3.38-mile grading and paving contract included the following:

Excavation, common	152,724 cu. yds.
Excavation, rock	19,679 cu. yds.
Excavation, special borrow	24,676 cu. yds.
Subgrade treatment	5,332 cu. yds.
Excavation, sinkholes	10,912 cu. yds.
Reinforced-concrete pavement	44,316 sq. yds.

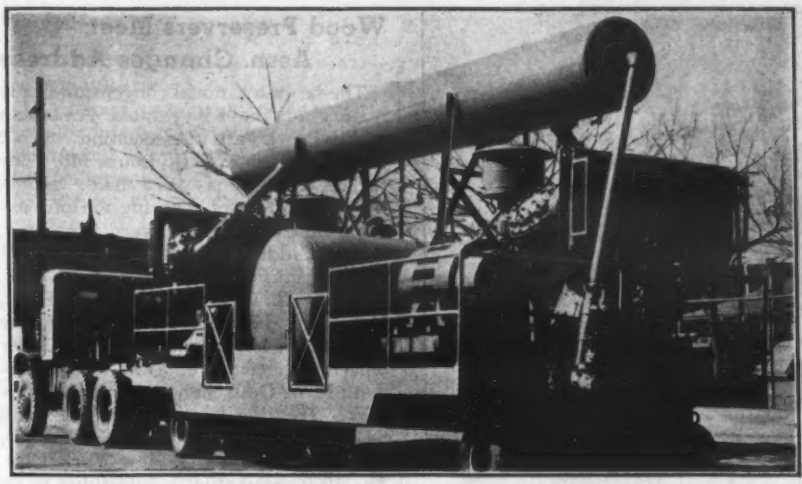
At the peak of concreting operations a maximum of 60 men were employed by the Calumet Paving Co. under the supervision of Earl Baker, Superintendent.

For the Indiana State Highway Commission, Orville O'Neal was Project Engineer. Ray H. Bower is Chief Engineer of the Commission. The project is located in the Seymour District of which Jerome Dustin is District Engineer.

Compressed-Air Unit Is Carried by Trailer

A huge compressed-air station has been made portable by mounting it on a specially designed trailer. The station consists of two electrically powered air compressors, an overhead receiver measuring 3 feet in diameter x 30 feet in length, and a 2,500-gallon water tank which feeds water into drill holes under pressure created by the compressors. Power for the 150-hp motors driving the compressors is obtained from an outside source of 2,300-volt current.

The two Joy compressors have a capacity of 1,500 cubic feet of air per minute and are both connected to the overhead air receiver which supplies a 110-pound working pressure. The complete unit weighs 50,000 pounds, and is 12 feet wide and 16 feet high. The air brakes and steering-dolly locking devices are also powered by the compressors. The entire unit is mounted on a 30-foot 16-tire trailer manufactured by the Winter-Weiss Co., 2201 Blake St., Dept. C., Denver, Colo. It is designed so that it can be steered from either end.



Applicable to tunnel and rock work, this big compressed-air station is mounted on a Winter-Weiss trailer. It consists of two Joy compressors connected to an overhead air receiver, and a water tank which feeds water into drill holes.

Further information on this trailer-compressor unit, or other trailers in the Winter-Weiss line, may be secured from the company. Or use the Request Card at page 16. Circle No. 60.

Pre-Stressing of Concrete Is Discussed by Engineer

Pre-stressed concrete was the subject of a recent joint meeting of The Structural Engineers Society of New York and The New York County Chapter of the New York State Society of Professional Engineers. Speaker at the meeting was L. Coff, a leading authority on the construction of pre-stressed-concrete structures. A. R. Gruehr of the Consolidated Edison Co. of New York City presided.

In pre-stressing, the concrete members are pre-compressed by wires or cables to such a degree that the fibers of the concrete are kept in compression regardless of the loads placed on the section. The process reduces considerably shear and diagonal stresses.

Pre-stressed concrete has several advantages, Mr. Coff pointed out. It produces a flexible and elastic slab for the construction of roads and runways, as shown by the Roebling exhibit at the ARBA Road Show in Chicago. A 10-inch slab 1⅝ inches was bent 3 inches and came back to its original size. Because of its tendency to resist cracking, pre-stressed concrete is particularly suitable for the construction of tunnels, water-storage tanks, and other structures where water seepage is likely to be a problem. A jointless floor slab of 14,000 square feet built by the Roebling Co. in Chicago does not show any hair cracks after 2½ years of heavy use, Mr. Coff reported. Structures of great size can be built by using small pre-cast sections, as long as the joints are kept in compression by the pre-stressing cables. Roebling test beams of 20-foot span, erected from normal hollow masonry blocks 8 inches x 8 inches x 16 inches, took considerable loads.

Mr. Coff illustrated his speech with slides of design computations, of methods of pre-stressing, and of outstanding structures built of pre-stressed concrete. He also showed a 15-minute movie of pre-stressing, prepared by Professor Gustave Magnel of the University of Ghent and furnished by the Preload Co.

After his prepared lecture, Mr. Coff answered several questions sent to him from the floor. The meeting concluded with refreshments and bull-sessions.

Welding Notes Expanded

The bi-monthly bulletin "Welding Notes for Engineers" now appears in a new format starting with the May issue. This bulletin is released by the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y., for welding engineers. Its articles are in case-history form and deal with typical and difficult problems of repair and construction in fields of steel, cast iron, hard overlay, and aluminum.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 129.

New Walter Truck Officials

Following the recent death of L. G. Stelzle, former President of the Walter Motor Truck Co., Queens, L. I., N. Y., the election of new officers has been announced by the company. Clinton A. Misson has been named President and Director. Maurice Walter has been elected Chairman of the Board of Directors, and will continue to serve as Vice President.

Mr. Misson is a graduate of the U. S. Naval Academy, did post-graduate work at Carnegie Institute of Technology, and served in the U. S. Navy until May, 1949. Mr. Walter, son of the founder of the company, has been associated with the firm for 30 years, in the capacities of Chief Engineer and Vice President.

The new Wooldridge TC-142 scraper has a wider front apron opening and a newly designed curved bowl ejector for fast discharge.

New 14-Yard Scraper

The Wooldridge Mfg. Co. of Sunnyvale, Calif., is now making deliveries of the new Model TC-142 tractor-drawn scraper, specifically designed to stand up under the stresses imposed by today's more powerful tractors. Modern formed-steel construction minimizes welding and increases the structural strength of the unit.

The capacities of the TC-142 are 14.2 cubic yards stuck and 17.5 heaped. The company states that comparative tests show faster loading characteristics than on its previous models as a result of the new 3-piece cutting edge. A wider 65-inch front apron opening and a newly designed curved bowl ejector have been added to achieve faster complete discharge of the load. The scraper has also been designed for increased stability and maneuverability over various types of terrain. The basic Wooldridge design features have been maintained.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 128.

Improved Magnetos

Magnetos said to give longer life and increased power to road and construction machinery are announced by Fairbanks, Morse & Co., Beloit, Wis. The new line of magnetos is known as the FM-X line and includes 1, 2, 4, and 6-cylinder magnetos suitable for all types of gasoline engines. Principal features claimed for them are longer-life breaker mechanism, larger bearings, improved magnetic rotor, and improved timing facilities on the 4-cylinder units.

Also announced by Fairbanks, Morse & Co. is a new universal impulse coupling known as the type UE. It is designed to simplify magneto installation and to provide for adjustments to various lug angles to meet changing operating conditions.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 20.

Trenchers in Four Models

Trenchers in four models are described in literature prepared by The Badger Machine Co., 570 E. Front St., Dept. E, Winona, Minn. These include the Model 302 wheel-mounted unit, the Model 302B on half-track mounting, the Model 302C on three-quarter-track mounting, and the Model 303 with full-track mounting. The Badger units are designed to dig trenches from 8 inches to 2 feet in width and a maximum of 10 feet in depth. They are hydraulically controlled and are said to dig at speeds up to 600 linear feet per hour.

The catalogs picture the digging action of the Badger trenchers and show them in use on a variety of operations. The principal features of each model are illustrated and described. Specifications and dimensions listed cover the power unit, boom, cross conveyor, frame and chassis, shovels, chain and sprocket, transmissions, shovel chain and drive sprocket, and road and digging speeds.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 65.

Wood Preservers Meet; Assn. Changes Address

The largest national convention in the history of the 45-year-old American Wood-Preservers' Association took place April 26-28 in St. Louis, Mo. Four technical sessions were held, and a number of papers covering various aspects of treated wood were presented.

J. S. Giddings, Santa Fe Tie & Lumber Preserving Co., Somerville, Texas, succeeds G. B. McGough, Bond Bros., Louisville, Ky., as President of the Association for the current year. Other officers elected were: First Vice President, F. W. Gottschalk, American Lumber & Treating Co., Chicago, Ill.; and Second Vice President, W. R. Yeager, Western Electric Co., New York City. The 1950 convention is scheduled to be held at the Rice Hotel, Houston, Texas, during April.

The American Wood-Preservers' Association recently moved its national headquarters to 839 Seventeenth St., N. W., Washington 6, D. C.

Equipment Set-Up Carves Red Tape

Purchasing Organization Has Broad Authority to Buy, Trade, and Rent All State Highway Equipment

✦ THE Missouri State Highway Department owns and operates over 2,000 pieces of heavy motorized equipment, all of which is bought, repaired, used, and traded in when necessary with a minimum of bookkeeping and red tape.

The key to the secret of this orderly process is the Bureau of Equipment of the Missouri State Highway Department. Under the leadership of R. P. Cummins, Superintendent of Equipment, the Bureau is responsible for the equipment units owned and operated by all the bureaus of the State Highway Department. It arranges for the purchase of all machines, it keeps each unit repaired and in operating condition, and it rents each piece of equipment on a somewhat flexible cost scale to such bureaus as Maintenance and Construction.

Full authorization to operate with a minimum of red tape, within the limits of its share of the highway budget, has made the Missouri Bureau of Equipment unique even among those states which have such an organization for the procurement of equipment. Free of insurance costs, unhampered by interest on investment, unfettered by the details private investors face when finance loans have to be arranged, the Bureau works with the kind of freedom which saves the State of Missouri a great deal of money.

Equipment Must Be Needed

Let's see how the system works.

Imagine, for example, that the maintenance foreman in one of the divisions has heard about a new type of loader. He believes it is the answer to a material-handling problem he has fought for years. His request for such a loader finds its way through the office of Division Maintenance Engineer to headquarters in Jefferson City, where it soon comes to the attention of Rex M. Whitton, Missouri's Engineer of Maintenance.

Whitton, after satisfying himself of the need for the equipment, can bring it to Cummins' attention by walking only 30 feet between their offices. Both men cooperate to such a degree that routine equipment needs can be arranged with very little, if any, discussion. In the case of this kind of new equipment, however, Whitton usually finds that he must not only justify its use, but he must also show enough work ahead so the rental fee for the machine can pay out the cost.

"We can't afford any equipment that will have to stand idle in a yard somewhere," Cummins will say. "It's got to work. It's got to draw rental fees. It must earn its keep."

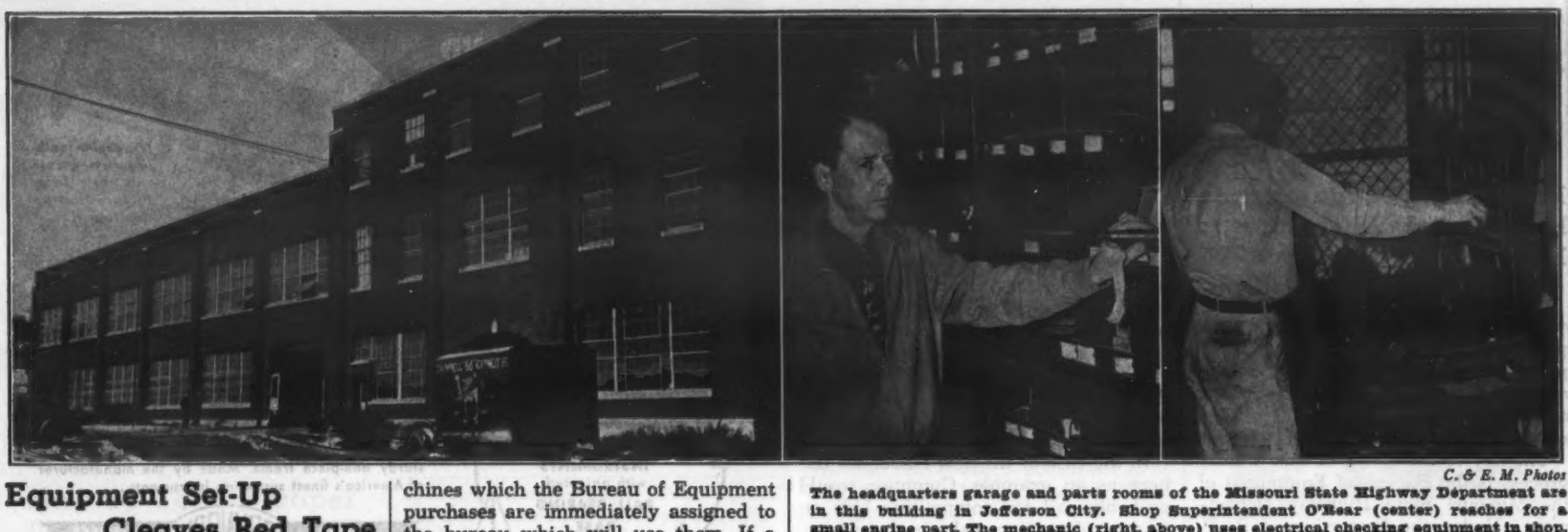
Cummins is known throughout the Highway Department as a horticultural expert, particularly in the development of morning-glories, and these equipment-request conferences often result in a meeting of minds with the usual repartee between men who respect Cummins' ability along both business and hobby lines. Despite any kind of persuasive talk about flowers, and sometimes because of it, requests for equipment have to be accompanied with ironclad proof of the need for each unit. Cummins is a shrewd, experienced, pipe-smoking Irishman, and with the aplomb which comes only after long association with the business, he demands proof exactly as if the money were to come out of his own bank account.

"It's the only way a man in public service can afford to operate," he maintains stoutly.

But once Cummins is convinced that equipment is needed, he moves fast. His department is set up to buy anything from office supplies to a large power shovel with a minimum of delay. Bids are secured to obtain the maximum competition possible, and the lowest best bid gets the order. This means the lowest bidder the majority of the time. Occasionally—although it happens very infrequently—Cummins may kick out the low bid because it is not the best. He has the full backing of the State Attorney General's office, with a Supreme Court of Missouri decision as a precedent.

In the case of the new loader we use here as an example, Cummins would probably call for competitive bids on loaders of similar make and capacity. In any case he would stimulate all possible competition. Should there be

(*Continued on next page*)



C. & E. M. Photos

The headquarters garage and parts rooms of the Missouri State Highway Department are in this building in Jefferson City. Shop Superintendent O'Rear (center) reaches for a small engine part. The mechanic (right, above) uses electrical checking equipment in shop.

Equipment Set-Up Cleaves Red Tape

(Continued from preceding page)

no competitive equipment, he would buy the loader outright. The order might even be arranged by a telephone call, to be confirmed in writing later, if the equipment was urgently needed.

Cummins believes that for all practical purposes, a shortage of equipment and parts no longer exists. He believes state highway departments are rapidly approaching as "normal" a state of normalcy as is possible in this day of high prices.

Equipment Used, Then Traded

Under Cummins' leadership, any piece of equipment in the state pool is worked until its economic life is over, then traded in for newer-type machines or perhaps an improved model of the machine. About 95 per cent of the machines which the Bureau of Equipment purchases are immediately assigned to the bureau which will use them. If a motor grader is to work for the Bureau of Maintenance, for example, that department will furnish the operator, schedule the work for the machine, and take it over for all practical purposes with the exception of whatever repairs become necessary. Division equipment garages in each division make these repairs.

The entire operating life of a piece of equipment is reflected in the work and the field reports of four mechanical inspectors. A. V. Spencer, D. W. Campbell, G. A. Dishman, and W. O. Porter make up this crew, and they are known as General Inspectors. When they leave Jefferson City to tour the state, they carry the same authority as Mr. Cummins or Tom W. Johnson, his capable assistant.

These four men are charged with the responsibility of a personal inspection of each piece of equipment in the state at least two times per year. When one of the inspectors plans a visit to a di-

(Concluded on next page)

vision, he first checks in at the division office. This enables the Division Engineer to know that equipment under his jurisdiction is being inspected, and permits him to get whatever suggestions he may have in mind to the attention of the inspectors.

One by one each piece of equipment in that division is then inspected. The inspectors frequently operate the machines for short periods of time. They check everything, or at least everything in sight. They write a report on the equipment which then serves as a mechanical record and also governs the timing of repairs. As a rule every piece of equipment in a division is inspected before the inspectors go on to the next one.

Maintenance men who use equipment unduly hard, or who abuse it in any way, are fortunately rare. Once in a while an instance of this kind occurs, and when it does, the maintenance men themselves have an expression for what happens. "Mr. Cummins tears our suspenders off!" is the explanation.

Repairs in the division garages are usually made with parts requisitioned from stock in the headquarters garage in Jefferson City. If the breakdown of equipment involves an extraordinary loss of productivity from a large crew of men, any mechanic or operator always has authority to make emergency purchases on the open market. When he does, he must make a report of the purchase, which is routed to the attention of the top men in the Bureau of Equipment. Let it happen often enough to establish a trend or a man's propensity for open-market purchases, and his suspenders are in danger. Why? The State gets a better price on large-quantity purchases such as are stored in the headquarters warehouse.

Rental fees for each piece of equipment are based on initial cost, length of service life, costs of repairs, and such other usual equipment costs. These fees naturally fluctuate somewhat with cost trends. In any case, the Bureau of Equipment tries to maintain itself as a non-profit organization, charging just the amount per day which will allow it to break even. Last year some $1,353,500 was spent for the operation and repair of rental equipment.

By treating each piece of equipment individually, Cummins finds that the State can sometimes realize very good bargains in trade-ins. On an average, about 20 pieces of motorized equipment are traded in every month, with all the shrewdness of a horse trade in almost every case.

C. & E. M. Photo
Maintenance Engineer Rex Whitton, left, is trying to convince Equipment Superintendent R. P. Cummins (center) of the need for a new piece of equipment. Cummins' assistant, Tom W. Johnson, puts his oar in too.

The Bureau of Equipment is also a central purchasing agency for everything else the State Highway Department uses, with the exception of ordinary road materials such as cement, asphalt, sand, and aggregates. Over 5,000 items are stocked in the Jefferson City warehouse, representing a $300,000 inventory.

It is estimated by many Missouri Highway Department engineers that this centralization of equipment within one bureau with the brains and authority to operate efficiently has saved the State untold sums of money since the Bureau was started back in 1931.

Noble to Serve Turnpike

Charles M. Noble has been appointed Chief Engineer of the New Jersey Turnpike during a six-month leave of absence from his post as Highway Engineer of the New Jersey State Highway Department. The appointment followed a request from Paul L. Troast, Chairman of the Turnpike Authority, to Governor Driscoll. The transfer was approved by Highway Commissioner Spencer Miller, Jr.

The Miller ball-bearing swivel shown here makes it possible to turn a well casing without twisting the block holding it, and fouling the cable. This particular swivel was inserted in a block already in use; as seen in the inset, a complete Miller swivel, block, and hook assembly is also available from the manufacturer.

Free-Turning Swivel For Hoisting Blocks

Twisting and kinking of wire lines in strung hoisting blocks can be prevented by the use of the Miller angular-thrust ball-bearing swivel, says the manufacturer, the General Machine & Welding Works, 1100 E. 2nd St., Pomona, Calif. The Miller swivels, it is said, enable loads to be run independently of the block, thus making placement of the load simpler and adding to job safety.

The Miller free-swinging swivels are available in complete assemblies with various sizes of blocks and hooks, or they can be supplied for blocks now in use. They come in sizes capable of handling loads up to 23 tons with a safety factor of more than 5 to 1. The Miller swivels are also available in 14 different styles and in 8 capacities for single-strand hoisting.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 45.

Welding Accessories Data

A catalog on welding accessories is now available from the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. This 16-page catalog covers both oxyacetylene and electric arc welding accessories, including goggles, hose, sparklighters, gloves, electrode holders, cable, weld-cleaning tools, helmets, and face shields. The catalog measures 8½ x 11 inches and is perforated for binder or looseleaf covers. It is illustrated with more than 50 photographs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 103.

Transfer in Shovel Co.

John W. Bishop has been transferred to the Chicago office of the Marion Power Shovel Co., Marion, Ohio. He will work with C. M. Gegenheimer, District Manager in charge of the Chicago office. Mr. Bishop has served as a sales representative of the company for the past several months, operating from headquarters at Evansville, Ind.

LeTourneau Honors Equipment Operator

In its program of giving recognition to qualified and skilled equipment operators, R. G. LeTourneau, Inc., Peoria, Ill., certifies those who are recommended by their contractor employers, and who have completed 1,000 hours or more of verified operating experience. These men are issued a card listing their qualifications, and are awarded a watch fob and a belt buckle.

The 10,000th operator to be certified is Joe Brady, Danville, Ill. He was presented his Certified Operator awards by Certified Operator No. 1—R. G. LeTourneau, noted designer and developer of high-speed rubber-tired construction equipment.

Joe Brady (right) the 10,000th equipment operator certified by LeTourneau, receives his award from Certified Operator 1, R. G. LeTourneau, President of the company.

Step-by-Step Directions On Use of Steel Hardener

Instructions on the use of the Hi-Speed-It steel-hardening compound are available from the Wilson Carbon Co., Inc., 60 E. 42nd St., New York 17, N. Y. No special equipment is needed to harden steel with the Hi-Speed-It powder, the manufacturer points out—any standard source of heat is sufficient in most cases.

The instruction booklet describes Hi-Speed-It, lists its features, and explains several applications and recommended uses. It tells step by step how to use the compound: how to heat the metal to be hardened, how to dip it in the powder, how long to let the materials fuse, how to re-heat and quench. It also describes the procedure for re-heating if deeper penetration is desired, special procedures for special types of hardening, and special treatments to follow with the various types of steel. The pamphlet also contains instructions for pack-hardening, and for the hardening of dies and heavy objects.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 104.

Features of a 3½-S Mixer

Features of the Dandie non-tilt end-discharge 3½-S concrete mixers are listed in a catalog distributed by the Kwik-Mix Co., a subsidiary of Koehring Co. located at Port Washington, Wis.

The catalog shows the operation of the V-belt-drive assembly which almost completely surrounds the drum to give a large gripping area; it shows the various controls, indicating their safety features and how they are located to simplify the operation of the mixer; and it contains photographs of the batch hopper, the air-cooled gasoline-engine power unit, the self-cleaning automatic syphon-type water-measuring tank, the blade and bucket design, and other features. Specifications cover the capacity, power unit and transmission, drum, discharge chute, batch hopper, lubrication, frame, wheels, bearings, and weight.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 71.

Concrete-Vibration Folder

A brand-new folder on concrete vibrators manufactured by the Maginniss Power Tool Co., Mansfield, Ohio, has just been released by the company. Specifications of the Model HCV-3 Hi-lectric concrete vibrator and the Model HGG-1 Hi-lectric gasoline generator which powers it are included.

The bulletin explains that all moving parts are in the vibrator head; that maintenance costs are low since only the ball bearings in the head are subject to wear; and that one standard generator will operate two standard vibrators at the same time.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 116.

Rubber-Asphalt Strip For Watertight Seals

A premolded rubberized-asphalt sealing strip is announced by the Servicised Products Corp., 6051 W. 65th St., Chicago, Ill. The manufacturer reports that it offers a simple and effective solution to the problem of watertight sealing of vertical and overhead concrete joints. It is a development of the hot-poured Para-Plastic compound for concrete-slab construction.

The Para-Plastic strips are designed to seal joints and maintain bond with concrete at temperatures down to 0 degrees. The material can be nailed directly to concrete forms; it can be applied directly to concrete by heating until the material is tacky; or it can be prepared for application by freshening with kerosene or gasoline, the manufacturer reports. The compound is available in three types: Para-Lateral, for sealing vertical and overhead joints; Baseal for sealing expansion and contraction joints at the subgrade; and Para-Plastic Coated Sponge Rubber, a pressure seal for vertical angles and overhead joints.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 28.

Contractors' Barrow

A wheelbarrow designed to take the heavy-duty requirements of building and paving contractors is manufactured by the Wilkinson Supply Co., P. O. Box 36, Fort Collins, Colo. The Wilkinson barrow is said to carry 88 per cent of the load on the wheel. Other features claimed for it are full-size oak handles, a tray made of armor steel, leakproof electrically welded seams, an axle designed to eliminate wobble, a rubber-tired 8-inch wheel operating on roller bearings, and a strong undercarriage of seamless tubing mounted with machine bolts and elastic stop nuts.

The Wilkinson wheelbarrow has a capacity of 4½ feet.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 68.

Koppers Executive Retires

J. P. Williams, Jr., Chairman of the Board of Directors of Koppers Co., Inc., Pittsburgh, Pa., has retired from active management of the company. He will continue in his capacity as Chairman of the Board, however, and will also serve as an adviser on special problems. Mr. Williams has been with the company since 1920.

Among 28 new Allis-Chalmers motor-graders recently delivered to West Virginia to help out in her secondary-road face-lifting program is this BD-2, shown pulling shoulders along the Kanawha River west of Charleston. With a $50,000,000 bond issue recently authorized by its legislature, the State plans to complete many of its more important farm-to-market roads and link them with the primary system. Total allocation under the distribution formula will be $40,578,316, including the outright grant per county of $200,000. The remaining $9,421,683 will be left in reserve by the Commission.

Distributor Doings

Honnen Heads McCoy Co. of Denver

Ed H. Honnen, well known heavy-construction contractor in the Rocky Mountain area, has been made President of the McCoy Co. of Denver, Colo. He succeeds Floyd W. McCoy who was recently killed in an airplane crash. Mrs. Dorothy McCoy will serve the firm as Vice President, and Rodney Bardwell has been elected Secretary.

No other changes have been made in the organization. J. K. Tibbetts continues as Director of Sales; Lloyd Faris is Parts Manager; George Goodwin, Manager of the Service Department; and Paul E. Austgen, Comptroller.

The McCoy Co. is Caterpillar distributor for the Denver area, and in addition handles a number of other well known lines of construction equipment.

Wheelbarrow Distributorships Open

The Champion Wheelbarrow Co. announces that it still has several distributor territories open. Complete details about the Champion wheelbarrows, which are made in two sizes with capacities of 4½ and 3½ cubic feet, will be found in this issue on page 24. Interested dealers should write to Champion at P. O. Box 138, Byron Center, Mich.

Joins Sales Staff of Mont. Dealer

The Central Machinery Co., Caterpillar distributor located at 721 Second St. S., Great Falls, Mont., announces that B. Daye Vaughn has recently joined its sales department. He was formerly with the Hi-Line Equipment Co., the Industrial Equipment Co., and the Normont Equipment Co., all of Great Falls.

Packaging Helps Dealers to Sell

The Eutectic Welding Alloys Corp. of New York City, has recently developed a new package for its product to makes sales easy for the distributor. These packages, called "Eutectic Economizers", are an innovation in the line. Complete descriptive literature appears on each, giving instructions on methods of use, recommended amperages, fluxing, etc.

There are 10 arc-welding rods and 8 gas-welding rods packaged in this manner. The packs which contain rods for gas welding also contain a jar of the corresponding Eutector flux to be used; so each package is a unit in itself. A single uniform price is held throughout the line no matter what type of rod the "Economizer Pack" contains.

New Marion Dealers in the West

Ray Corson Machinery Co., 350 Kalamath St., Denver, Colo., has been appointed Marion Power Shovel Co. distributor for the entire state of Colorado.

Ray E. Corson is President and General Manager of the firm, J. J. Booth is Vice President and Sales Manager, and J. E. Biggs serves as Treasurer and Office Manager. The company was established in 1932 and incorporated in 1948. In addition to Marion, it serves as distributor for some ten other prominent manufacturing concerns.

M & F Equipment Co. of Albuquerque is now the Marion Power Shovel Co. distributor for all of New Mexico lying north of and including Catron, Socorro, Lincoln, Chaves, and Roosevelt Counties. Headquarters for the firm are located at 2521 Isleta Highway in Albuquerque.

FWD Los Angeles Branch Purchased

Three partners have purchased The Four Wheel Drive Auto Co.'s branch in Los Angeles, the FWD Pacific Co. They are Robert L. Koehler, former FWD Director of Sales; John E. Battes, former Western Zone Sales Manager; and Oscar E. Betow. The FWD Pacific Co. distributes FWD trucks throughout California.

Nesbitt Now Sells for Kinney

The Nesbitt Equipment Co., 451 Calvert Ave., Alexandria, Va., now represents the Kinney Mfg. Co., of Boston, Mass., for the resale of its bituminous distributors in the District of Columbia, in Maryland, and in Virginia—except that part lying west of the counties of Craig, Roanoke, and Floyd.

This new plant belongs to Alban Tractor Co., Inc., Caterpillar distributor of Baltimore, Md. The building is fireproof and all offices are air-conditioned.

Alban Tractor Co. Opens New Plant

The Alban Tractor Co., Inc., has moved into new quarters at 8531 Pulaski Highway, Route 40, Baltimore 6, Md. The new plant is approximately 200 feet square and is located on a 3-acre tract of land. The front of the building faces the Pulaski Highway, the main route between Washington, D. C., and New York City; the rear faces the Old Post Road to Philadelphia. The building is fireproof and all offices are summer and winter air-conditioned.

(Continued on next page)

Distributor Doings

(*Continued from preceding page*)

The showroom measures 50 x 110 feet and has large plate-glass windows at the front and side. A large room on the second floor is set aside for sales meetings, classes, and other business and public-relations functions. A ramp 120 feet long and 12 feet wide is built alongside the parts department to expedite shipments to and from this department. A separate building houses the garage and wash-and-paint shop; a section of it is used for rebuilding track-type tractor treads. The loading platform at the rear of the main building has two different heights, one for tractors and one for trucks. Alban maintains branches at Salisbury, Md., and Arlington, Va.

Engines and Parts Dealer, Mass.

Ralph D. Jones, Inc., Springfield, Mass., has been named a dealer for Chrysler industrial engines and parts, announces the Industrial Engine Division, Chrysler Corp., Detroit, Mich.

Will Represent Pioneer in N. Y.

Pioneer Engineering Works, Inc., of Minneapolis, Minn., announces the appointment of three new distributors for its Continuflo line in New York State.

The Trevor Corp., P.O. Box 128, Buffalo 21, N. Y., will cover Niagara, Orleans, Monroe, Wayne, Erie, Genesee, Livingston, Ontario, Seneca, Wyoming, Yates, Chautauqua, Cattaraugus, Allegany, Steuben, Schuyler, Chemung, and Tioga Counties. Contractors Sales Co., Inc., Green Island, Troy, N. Y., will service Otsego, Schoharie, Greene, Columbia, Montgomery, Schenectady, Rensselaer, Fulton, Saratoga, Washington, Hamilton, Warren, and Essex Counties. And Contractors Syracuse Sales Co., Inc., 862 Emerson Ave., Syracuse 4, N. Y., will handle Clinton, Franklin, St. Lawrence, Lewis, Jefferson, Oswego, Oneida, Herkimer, Cayuga, Tompkins, Cortland, Madison, Chenango, and Onondaga Counties. James Ray Norton will continue to serve the area in and around New York City.

Will Sell Hard-Facing Alloys

The distributor organization of Stoody Co., Whittier, Calif., maker of hard-facing alloys, has been enlarged by the addition of the following firms: Mobile Welding Supply Co., Inc., 2 Government St., Mobile, Ala.; Morris, Wheeler & Co., Inc., Fox St. and Roberts Ave., Philadelphia, Pa.; Maine Oxy-Acetylene Supply Co., 7 Minot Ave., Auburn, Maine; The Alfred B. King Co., 200 Winchester Ave., New Haven, Conn.; Fuller Supply Co., Inc., 12 Liberty St., Utica, N. Y.; Corp Brothers, Inc., 28 Mason St., Providence, R. I.

Two foreign distributors have also been named: Manuel Sigren, Casilla 2697, Santiago, Chile, who will cover that entire country; and Bandeira De Mello S. A., Ave. Pres. Wilson 198—Sala 603, Rio de Janeiro, Brazil, who will represent Stoody in the central area from Bahia to the state of Santa Catarina.

Minneapolis-Moline distributors were represented at a recent meeting the company held to coordinate industrial sales effort (see page 78): W. L. Fibbin (left), Assistant Sales Manager of Frick Co., Waynesboro, Pa., and Thomas Vaughn, Manager of the Reed Hardware & Implement Co., Idaho Falls, Idaho.

Merrill Midwest Sales Coverage

In keeping with its announced program of expanding sales activities, Merrill Brothers of Maspeth, N. Y., announces that four new organizations have been appointed as sales representatives. They will handle the company's line of drop forgings and materials-lifting devices.

The George A. Allen Co., 9 S. Clinton St., Chicago, Ill., will cover Chicago and Illinois, Michigan, and Kansas. The C. B. Lawrence Co., 740 Superior Ave. N. W., Cleveland, Ohio, will serve Ohio, Michigan, and Indiana. Henry R. Hansen, 330 Downing St., Denver 3, Colo., is the representative for Colorado, Wyoming, Utah, and New Mexico. Val W. Ove Metal Products Co., 1348 N. 37th St., Milwaukee 8, Wis., will cover Wisconsin, the Michigan peninsula, Minnesota, Iowa, and Omaha, Nebr.

Fingerlakes Equipment Adds Howe

The Fingerlakes Equipment Corp. has appointed Douglas K. Howe as General Manager. Fingerlakes is engaged in the rental and sale of used and rebuilt construction equipment. Offices are located at 100 Greenway Ave., Syracuse, N. Y. Mr. Howe formerly was Sales Manager of Harrod Equipment Co., Inc.

Riddell Appoints Four Distributors

The appointment of four distributors for Warco motor graders and Hercules road rollers is announced by the W. A. Riddell Corp., Bucyrús, Ohio. Hoye & Williams, Shreveport, has been awarded the Shreveport and northern Louisiana territory. Clem Fleury Equipment Co., Cedar Rapids, is named as distributor

(*Concluded on next page*)

Distributor Doings

(Continued from preceding page)

for eastern Iowa. Shaffer Equipment & Supply Co., Richmond, is named exclusive distributor in the state of Virginia. Boehck Engineering Co., Inc., Houston, will handle sales and service of the Warco and Hercules equipment in the Houston territory.

To Manage Dravo-Doyle Co. Sales

Dravo-Doyle Co. announces the appointment of Charles N. Hollingsworth, Jr., as Sales Manager and John H. Noble as Assistant Sales Manager. Mr. Hollingsworth has been associated with the company for 25 years in the sale of road-building and construction equipment. He is a member of the National Affairs Committee of the Associated Equipment Dealers and Past President of the Pittsburgh Equipment Dealers Chapter of the AED. Mr. Noble has been with Dravo-Doyle for the past 20 years and was formerly a sales representative.

Four New Crane Distributors

The Bucyrus-Erie Co. of South Milwaukee, Wis., has recently appointed four new distributors for its Hydrocrane. The Porter Supply Co., Inc., Huntington, W. Va., will sell and service the all-hydraulic truck crane throughout the southern half of West Virginia. Lyons Machinery Co., 904 Broadway, Little Rock, Ark., will sell and service the unit throughout central and western Arkansas. Dow & Co., Inc., 1820 Elmwood Ave., Buffalo, N. Y., will cover the western portion of New York State, and James W. Bell Co., Cedar Rapids, Iowa, will cover central eastern Iowa.

Welding-Stud Franchise in Ohio

A policy of granting exclusive franchises for the sale of its end-welded roofing and siding fasteners has been announced by the Nelson Stud Welding Division, Morton Gregory Corp., of Lorain, Ohio. The first franchise has been awarded to the Nelson Construction Service Co., Cleveland, Ohio, for the northern Ohio area. Robert A. Tissot, for eight years Construction Products Sales Engineer for the Barrett Divison of Allied Chemical & Dye Corp., will head the firm.

New Airco Plants Opened

Two new plants, one for the production of oxygen and the other for acetylene, have recently been opened by the Air Reduction Co. of New York City, manufacturer of industrial gases and welding equipment.

One of the plants is located in Flint, Mich. Built at a cost of over $250,000, it will produce more than 4,000,000 cubic feet of oxygen a month to serve the industrial needs of Flint and the surrounding area. In addition to oxygen manufacture, this plant will also be an acetylene-gas supply point and a storeroom for welding equipment and supplies. Leo Vansaw is Plant Superintendent.

To serve the New England area, a new acetylene plant has been opened in Acton, Mass. It has a capacity of 100,000 cubic feet of acetylene per day. A. L. Beck is the Plant Superintendent.

Air Reduction Co. has established a new warehouse point in Tulsa, Okla., with Fidelity Transfer & Storage Co. at 1540 E. Fifth St. The warehouse will carry supplies of oxygen and acetylene gas.

Carroll New Gen. Sales Mgr. Of American Hoist & Derrick

John E. Carroll has been appointed General Sales Manager of the American Hoist & Derrick Co., St. Paul, Minn. A graduate engineer from the University of Minnesota, Mr. Carroll started to work for American Hoist in 1937 as a District Sales Representative in the Texas, then Chicago, and later west-coast territory. He resigned to become a partner in the firm of Harron, Rickard & McCone Co. of southern California, heading the Construction Equipment Division.

An All-Purpose Spreader Co. Model 120 base paver waits for a load of crushed stone. This model handles up to 150 tons an hour and lays 8 to 12-foot widths 12 inches thick.

High-Speed Finish For Concrete Walls

A finishing material for use on both exterior or interior concrete surfaces is made by the Irvington Form & Tank Corp., 43 Cedar St., New York, N. Y. The new Atlas speed finish, which can be applied on old or freshly poured concrete, eliminates rubbing or other special treatments, the manufacturer states. Supplied in powder form, it is mixed with water for interior use, and with sand and water for exterior use. The finish is applied by a cork float and is said to make a chemical as well as a mechanical bond with the concrete.

The exterior treatment is applied in two coats, bonding and finishing. The bond coat is said to fill the voids and to smooth the wall. The finishing coat can be applied after the structure is completed, to obtain a uniform color throughout. The interior finish, Irvington reports, leaves the surface smooth enough for paint to be applied directly to it without plastering. It can be left unpainted, if desired.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 56.

FM Radio Equipment For High Efficiency

Voice communication between mobile units and a central office is possible with equipment manufactured by the Federal Telephone & Radio Corp., 100 Kingsland Road, Clifton, N. J. According to Federal, its FM mobile radio equipment features compact construction, easy installation, accessibility for inspection and servicing, and economy of operation. As the company points out, the use of radio by contractors and highway departments permits close cooperation among all units; work can be coordinated into a smooth-running operation; and emergency orders or changes in detail can be transmitted immediately.

As a special construction feature, Federal equipment uses the Selecto Call circuit to permit the central office to contact one or more mobile units without disturbing any of the others. This is said to eliminate the reception of unnecessary calls and other sources of interference. A shock-mounted metal case measuring 9⅝ x 11⅞ x 13½ inches houses both the transmitter and receiver.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 98.

P&H Opens Warehouse In N. J. to Serve East

A day-long open house celebrated the opening of Harnischfeger Corp.'s new Teterboro, N. J., warehouse and offices on May 21. A large number of public officials, military representatives, and businessmen attended and saw demonstrations of the company's products.

Visitors were given the opportunity to operate the various pieces of equipment. Sound-motion pictures of welding and construction equipment were shown continuously through the day. Especially interesting to many were the recently developed diesel engines. A mechanic demonstrated the simplicity of servicing them by speed tear-downs and build-ups.

With the completion of this new warehouse, P&H hopes to provide faster service to eastern customers. A large inventory of equipment, including excavators, truck cranes, welding machines and electrodes, hoists, etc., will be maintained at this new location for supplying the eastern area.

Approximately 16 miles from New York City, the new Teterboro quarters contain over 14,000 square feet of floor space and are situated on an 8½-acre plot of land. The building includes, in addition to warehouse space, large offices and service facilities. Rail service will be over the spur tracks of the Erie Railroad. The new Teterboro building, located just off Highway 6 at Huyler and North, was designed and built by the Austin Co., Chicago.

Pile-Driving Catalog

A 120-page catalog on pile drivers, pile extractors, and complete pile-driving rigs has just been issued by the McKiernan-Terry Corp. The catalog covers the complete McKiernan-Terry line of both double-acting and single-acting hammers, double-acting pile extractors, and different types of rigs for use on land and water. More than 140 illustrations show this equipment in use driving concrete, steel, and wood piles on bridge, dam, foundation, highway, railroad, pier, and other jobs all over the world.

The catalog has been prepared to serve as a complete manual for the selection and use of pile-driving equipment for every purpose. The engineering information includes formulae for bearing power of piles and other pertinent data, selection data, complete specifications dimensions, parts lists, operating and maintenance instructions, along with drawings of details, operating set-ups, and rigs.

Engineers and contractors may obtain copies of this handbook by writing on their company letterhead to the McKiernan-Terry Corp., Dept. J, 15 Park Row, New York 7, N. Y.

Johnson Joins Stoody Co.

Amos Johnson, prominent figure in the welding industry of the northwest, has recently joined the staff of the Field Sales Department of Stoody Co., California manufacturer of hard-facing alloys. Mr. Johnson will assist distributors in Minnesota and in the Dakotas.

Truck-Mounted Excavator

Information on the new Model 44 Corsair truck-mounted crane and excavator is contained in a bulletin issued by the Wayne Crane Division, American Steel Dredge Co., Inc., 2000 Taylor St., Fort Wayne 1, Ind. The Model 44 has a ½-yard 10-ton capacity and can be used as a shovel, trench hoe, dragline, crane, clamshell, magnet, or pile driver, the manufacturer states.

The bulletin lists complete specifications covering the engine, steering gear, transmission, clutches, axles, brakes, frame, cab, standard equipment, and all principal dimensions. A table is provided on load capacities of the Model 44 with a 30-foot boom and auxiliary counterweight.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 43.

Bituminous Distributors

Bituminous distributors are the subject of a 12-page catalog issued by Brokol Mfg. Co., Inc., 94 Madison St., Newark 5, N. J. Feature of the catalog is a 2-page cut-away drawing of the Brokol distributor to which are keyed short text descriptions of the various parts of the unit.

Bulletin No. 48-3 lists seven features claimed for the Brokol, including low construction of the tank, efficient location of the various parts, fast heating, and an automatic suck-back system. Complete construction details are provided on the tank, insulation, heating equipment, pump, engine, spray control, spraybars, and other parts. The full-circulating spraybar is covered in special detail.

Standard equipment provided with the Brokol distributor is listed in the catalog. A chart of standard tank sizes and dimensions gives information on Brokol units ranging in tank capacities from 600 to 2,000 gallons. Listed are the tank width, depth, length, thickness of shell, overall dimensions, distance from cab to center of rear axle, shipping data, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 67.

Two New Mack Managers

J. W. Adelung is now Manager of Mack-International Motor Truck Corp.'s Brooklyn branch, and W. A. Brady is Manager of the company's White Plains, N. Y., branch. Mr. Adelung joined Mack in 1946; Mr. Brady in 1938.

Road-Grading Crew Beats Rough Terrain

New Highway Job Blasted Through Range Country As Men and Equipment Beat Time Limit

✦ LOCAL and tourist traffic on U. S. 285 just north of Carlsbad, N. Mex., has ruined the old black-top highway which carried sightseers towards Carlsbad Caverns for many years. An 8.5-mile stretch of this highway is now being rebuilt to more modern standards for the New Mexico State Highway Commission by W. T. Bookout Construction Co. of Las Vegas, N. Mex.

The $504,000 contract contains 233,550 cubic yards of unclassified excavation, 11 box culverts, a bridge, production and installation of 55,600 tons of crushed rock ballast, and a 2-inch bituminous paved mat. The State allows 350 working days from January 15 for completion, but men and equipment are performing so efficiently that the job is expected to wind up by this August.

Hard caliche, rough conglomerate and some solid limestone formations are general throughout. It is hard excavation because there is hardly a cubic yard of dirt on the project. Roughly 42 per cent of the total yardage requires drilling and shooting, with power shovel loading.

Modern Design Throughout

Approximately 80 per cent of the new highway lies on a new location, in order to bring its alignment and grade standards up to the requirements of modern traffic. This new alignment makes it necessary to cross and re-cross the crooked road being replaced. Handling traffic and constructing short detours at some of these locations was one of the problems of the project.

In cross-sectional design, the highway meets high modern requirements for a 2-lane road. The top of the crushed-rock ballast course is 46 feet wide, and the ballast extends through the 10-foot shoulders on each side of a 3-inch leveling course upon which is a 2-inch bituminous pavement. Crushed rock ballast and the leveling course will vary from 6 to 12 inches thick, depending on the type of subgrade. The cuts are to be generally on slopes of from 4 to 1 to ½ to 1, or about as steep as the formations will naturally stand without excessive maintenance later on.

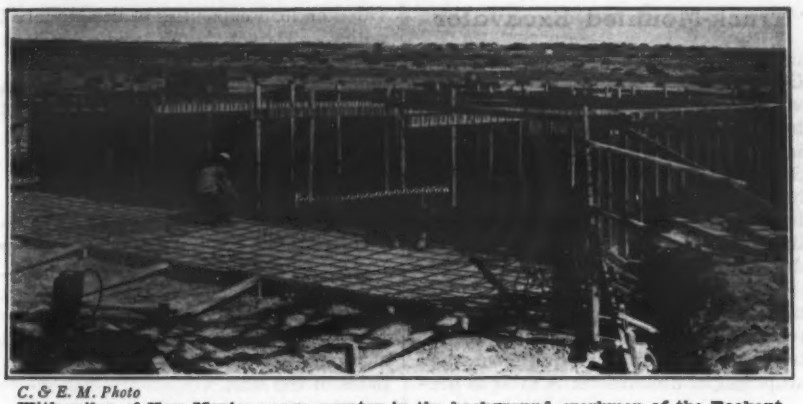
In fill sections the slopes are to be 4 to 1 under 5 feet high; 2 to 1 up to 10 feet. There are few excessively high fills. Density requirements for embankment material are about 95 per cent of modified AASHO weight, and the lifts are being processed a little on the dry side so far as moisture is concerned.

A prime coat of MC-1 asphalt 26 feet wide will cover the crushed leveling course. This will then in turn be covered with a 24-foot-wide course of mixed-in-place crushed rock and MC-3 asphalt. The road-mixed pavement will also be sealed with RC-4 asphalt and a chip coat to make a smooth, silent, skid-proof surface.

Culverts Built Ahead

In order to keep well ahead of grading equipment with the relatively slower concrete work, a carpenter and concrete crew started the construction of concrete box culverts in some of the first job activity. Since the general design of all the culverts was similar, practically the same type of formwork, steel, and concrete was general for all this work.

Forms consisted of 2 x 4 studs on centers of from 12 to 15 inches, with plywood facing nailed on. The forms were tied together by steel form bolts, whose nuts were then tightened down on double 2 x 4 wales on the outside of the form at right angles to the studs. The forms were also braced against lateral movement by 2 x 4 and 4 x 4 pieces, leading from the top of the form to a toe stake in the ground. The structural excavation ahead of form work was handled by a Bucyrus-Erie 1¼-yard dragline.



C. & E. M. Photo
With miles of New Mexico range country in the background, workmen of the Bookout Construction Co. set steel reinforcement in a culvert slab. The plywood-faced concrete forms are partly set up.

Reinforcing steel is being sent to the job cut and bent according to plans, thus minimizing the need for extensive

(*Continued on next page*)

C. & E. M. Photos

The D8-drawn LeTourneau K-30 Rooter above is ripping its way through a shallow rock cut on the Carlsbad job. At right, a Bucyrus-Erie 43-B shovel loads out blasted rock from a cut. The rock was hauled to fills by five Koehring Dumptors.

steel work in the field. Men simply open the bundles and set the reinforcing in its proper place in the forms, tying the intersections with soft wire.

Two sizes of concrete aggregates make up the mix: sand and 1½-inch maximum-size coarse aggregate. Both materials are well graded within specification limits. The materials come in to the job from Carlsbad by truck, and are dumped in two piles next to a Miller & Smith double compartment 25-ton weigh bin.

As the aggregates are weighed out of this batching plant, a dump truck carries them over to a small Jaeger 16S mixer, where they are mixed with El Toro sack cement. Water from the Pecos River, only 2 miles distant, is too high in alkali content to use it in the concrete mix. City water from Carlsbad has to be hauled out on a 2,250-gallon Chevrolet truck-mounted tank, and stored for use in a 1,000-gallon stand-by tank at the mixer. A small CMC 3-inch pump is used here to expedite the unloading of water.

The finished concrete is being cured with cotton mats kept wet for 7 days. River water is permitted on this part of the work.

Drilling and Blasting

All of the job was tough digging, but solid formations of limestone and caliche are the worst. Much of this material is being drilled and shot, and at best it takes a heavy ripper to break the stuff loose.

Over 1,000 cubic feet of air capacity is available in the form of one 365-cfm Joy, a 315 Gardner-Denver, a 315 Le Roi, and a portable 105 Ingersoll-Rand. Wagon-drill equipment consists only of one machine: a Gardner-Denver D89. Pneumatic hand equipment includes eight Gardner-Denver S55's. All the drills are using Timken steel and detachable rock bits.

The rock varies so much in character that no general drilling or loading rules will apply to any sizable per cent of the job. On some of the hardest formations, hole centers have to be narrow, while on other softer rock less powder will shatter it so that it can be handled. Jackhammer men simply drill each formation as heavily as the powderman directs, and move on. Excellent bulldozer pioneering made it quite easy for them to get their machines around.

Du Pont No. 4 powder is being used, loading the holes to within a few feet

(*Concluded on next page*)

Road-Grading Crew Beats Rough Terrain

(*Continued from preceding page*)

of the top. The shots are pulled by a hand blasting machine and electric caps.

Shovel Loads Blasted Rock

A Bucyrus-Erie 43-B power shovel is loading blasted stone to five Koehring Dumptors. Two of these machines are W55's; three are W60's. The Dumptors then haul the stone to fills, where it is spread by a Caterpillar D8-mounted dozer.

An LS-85 Link-Belt machine with two bottom-dump Euclids is also doing similar work in formations of bedded conglomerate.

The grading fleet for that part of the job which can be moved without shooting is built around short and long-range tractor equipment. Three Super C Tournapulls are handling the long-haul work beyond 1,000 feet, and the short-haul tractor equipment takes care of the rest. Three Carryall units are being used here: a LeTourneau Y-12, a K, and an FP. Prime-mover equipment consists of nine tractors: five D8's, a D7, a D6, and an International TD-18. The other machine is a smaller-size Caterpillar.

A LeTourneau K-30 Rooter is being used to good advantage ahead of the tractor equipment fleet. It is handled by a D8 tractor.

The material, after being dug out by push-cat loading, is taken to fill areas and dumped in lifts not to exceed 8 inches. There are five water tank trucks on the job, ranging in size from 1,000 to 4,250 gallons. A 5-inch Rex pump at the Pecos River fills the tanks. The river parallels the road, and so water is readily available from one end of the 8½-mile long project to the other.

As the water is applied, two Caterpillar No. 12 motor graders blade the lifts ahead of four sets of heavy-duty Southwest sheepsfoot rollers drawn by Caterpillar D7 and D8 tractors. It requires about five passes of these rollers to develop the required density.

Bank sloping is being done mechanically by a D8 machine or a motor grader.

Crusher Will Make Ballast

When CONTRACTORS AND ENGINEERS MONTHLY visited the project, work had just begun on the pit which eventually will produce the ballast-course crushed material. The pit area had been cleaned off by bulldozers, and work was under way to set up the rock-crushing equipment.

Crushing equipment, in order, will consist of a Pioneer 24 x 36 primary jaw, Caterpillar-D13000-powered, with a Pioneer traveling grizzly attachment. Crushed material from this primary unit will travel over a 50-foot x 30-inch conveyor to a Cedarapids Master Tandem crushing unit. The crushed rock which passes this machine will pass to a 25-ton surge bin, where it will be transferred to dump trucks for the journey to the highway.

A severe run of spring weather slowed the work down at first, and high winds then took over. By the first of April, much of this disagreeable weather was over and the job was set to roll along at an accelerated pace.

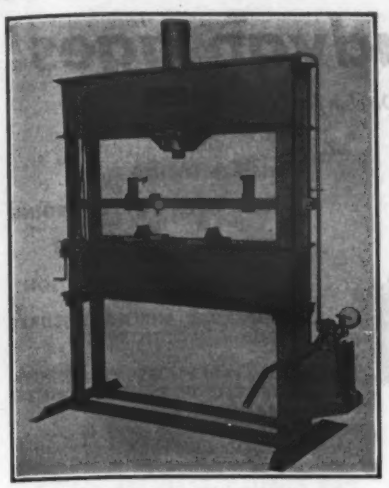
C. & E. M. Photo

This Cedarapids crushing unit has just moved in to the New Mexico job and is being set up to crush ballast-course material.

Personnel

The job was designed and directed under the general supervision of B. G. Dwyre, State Highway Engineer, with T. B. White at Roswell the District Engineer in charge. C. D. Rickman is Project Engineer.

For the contractor, the field work was directed by General Superintendent R. J. Curtis, assisted by Carl Wilhoit as Expediter and Field Clerk. Willis Orr was Master Mechanic, and James H. Coleman was Structure Foreman in charge of culvert work.



The improved model of the Rodgers 60-ton-capacity shop press is designed to provide fast, versatile action for broad shop use. Features include full 13-inch pressure stroke and a new 2-speed hydraulic hand pump with automatic shift.

Improved Shop Press

New versions of its 60 and 80-ton-capacity shop presses are announced by Rodgers Hydraulic, Inc., 7413 Walker St., St. Louis Park, Minneapolis 16, Minn. Among the features claimed for the new units are a full 13-inch pressure stroke, accurately matched and machined V-blocks, lower bolsters supported by bearing blocks on steel support pins, fast arbor-press action eliminating the need for a separate arbor press, and operation by hand or power pumps.

The improved 2-speed hydraulic hand pump with automatic shift is said to permit fast ram speeds of 1⅛ inches per stroke with 2-ton high-speed pressures on the 60-ton model, and ¾-inch travel with 3 tons on the 80-ton model. According to the manufacturer, the pumps will shift automatically into high pressure when the maximum 2 or 3-ton pressure has been reached.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 84.

Name of Oil Changed

A name change for the top grade of Penn Drake motor oil is announced by the Pennsylvania Refining Co., 2686 Lisbon Road, Cleveland 4, Ohio. This product will now be known as Premium Penn Drake, in accordance with a new nomenclature adopted by The American Petroleum Institute and the Society of Automotive Engineers. According to the company, Premium Penn Drake conforms in every detail to a premium-type oil as defined by these organizations.

Premium Penn Drake has high oxidation stability, says the company; and it prevents bearing corrosion; these qualities make it especially suitable for use in internal-combustion engines where operating conditions are severe. It is an Emblem-Grade Pennsylvania oil which is 100 per cent pure, and it bears PGCOA permit No. 15, the company reports. It is packaged in 5 and 1-quart cans and in 5-gallon pails and drums.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 33.

Helmet for Welders

A welding helmet with movable blinker lens is available from Welders' Products, Dept. 46, 141 W. Jackson Blvd., Chicago 4, Ill. The welder can lower and raise the filter lens by a downward or upward movement of his chin against a pivoted chin strap. His hands are left free, and he does not have to nod his head to get his helmet in place.

The helmet is constructed of a high-grade vulcanized fiber which has been tested under humid, dry, and other atmospheric conditions. Its protective lens is designed to meet Federal specifications in all shades desired. The head gear and chin rest are fully adjustable for ease and comfort.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 30.

Wagner "News" Starts

A brand-new bulletin called "Wagner-mobile News" is to be issued monthly by Mixermobile Distributors, Inc., 6855 N. E. Halsey St., Portland 16, Oreg. The purpose of the publication is to enable the company's owners, the Wagner brothers, to get better acquainted with their customers and their dealers. The paper will report developments in the company's line of construction and materials-handling equipment. It will also serve customers and dealers as a medium for the exchange of news and ideas.

Copies may be obtained from the company, or by using the Request Card at page 16. Circle No. 127.

Electric-shovel efficiency independent of power-line service is provided by the P&H 4 to 4½-cubic-yard diesel-electric excavator—the new Model 1400-DE.

New Diesel-Electric 4½-Yard Excavator

A diesel-electric excavator with a capacity of 4 to 4½ cubic yards is announced by the Harnischfeger Corp., 4419 W. National Ave., Milwaukee 14, Wis. The Model 1400-DE is powered by a heavy-duty slow-speed diesel engine which runs the crowd and swing generator sets. The generator set, with alternator, is designed specifically for shovel service, with a swing and crowd generator mounted in one frame. The generator set is connected to the diesel engine by a heavy-duty multiple V-belt.

The P&H excavator features a low field current and specially designed magnetic-field structure which combine to produce fast responses to changes of both load and control, the manufacturer states. A constant-duty low-voltage alternator provides steady power for Magnetron control, blowers, lights, etc.

The P&H Magnetorque hoist drive is said to eliminate the hoist generator, hoist motor, slip friction clutches, and other mechanical devices usually involved in the hoist train. The cushioning characteristics of the Magnetorque drive, combined with the electrical power system of the crowd and swing, relieve the diesel engine of severe pull-down in speed.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 1.

Ready, Come the Snow?

Though you may be sweltering in the mid-summer heat now, remember—"later on, snow will glisten". And remember it's a wise highway department that checks its snow-fighting equipment well in advance. To jog your memory, the Otto Biefeld Co. of Watertown, Wis., has prepared a catalog on its complete line of truck-mounted snow plows. It's full of photos of heavy snow, a nice cool thought at this time of year.

The catalog contains information on the complete line of Wisconsin snow plows. These include the Class A models for 1½ to 2-ton-capacity trucks; the Model B for 3 to 4-ton trucks; the Class C for 5 to 7½-ton trucks; the Class D for 10-ton trucks; and the Wisconsin special side wings for trucks for use with the Class C and D plows.

Each of the Wisconsin plows is illustrated in the catalog. Specifications listed cover the cutting width, height at front and rear, greatest width at the top, thickness of the moldboard, type of hydraulic hoist, and weight.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 64.

Booklet on Earth-Moving

A new 16-page illustrated booklet called "Profiting Through Earth-Moving . . . the Caterpillar Way" has been issued by the Caterpillar Tractor Co., Peoria 8, Ill. This brochure brings to the reader applications and job studies of bulldozers, scrapers, wagons, motor graders, and allied equipment. It gives performance data on level construction, backfilling, land clearing, foundation work, highway and dam construction, irrigation ditching, snow removal, and oil-mixing for surfacing roadbeds.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 119.

Nuts and Rib Bolts

Two catalogs on nuts and bolts for structural usage are issued by Automatic Nut Co., Inc., of Lebanon, Pa. One is on the Anco-Nut and lists its uses, essential features, and advantages for all-around use. The other is a 4-page two-color catalog on the structural rib bolt equipped with the Anco-Nut. This lists the pertinent features of each, giving tables of available sizes and costs, and allowable loads.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 131.

The Viateer lantern support serves the three-fold purpose of averting lantern breakage, preventing fuel spillage, and reducing lantern theft, says its manufacturer.

Lantern Held Upright By Steel Safety Base

A steel lantern support is manufactured by Pucel Enterprises, Inc., 3764 Kelley Ave., Cleveland 14, Ohio. The Viateer lantern stand is designed to grip the lantern base firmly and keep the lantern upright. It helps avert lantern breakage, it prevents spillage of fuel, and it reduces lantern theft, says the manufacturer.

The platform of the Viateer measures approximately 4 x 7 inches. The stand has three upright reinforced welded steel clamps, one of which is of the spring-locking type. A vertical rod on each of the 4-inch sides is said to hold the lantern in an upright position regardless of where it is set. These 13-inch-long rods are adjustable to vertical, horizontal, or 45-degree positions. The Viateer stand is approximately 19 inches tall and 10 inches wide.

Inflexible L-shaped 1-inch steel brackets on the rods enable the stand to be attached to wood barricades and structures. The rods lend support on one side, the brackets on the other, when the unit is set on a wood barricade. The brackets can be attached by nails, screws, or bolts for greater security.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 100.

High-Speed Sprayer Made in Two Models

A high-speed sprayer for weed-killing compounds is manufactured by Fabricated Metals, 900 Thirty-Third Ave., Oakland 1, Calif. The SprayRite units are designed for installation on all popular makes of wheel tractors; they are also available in skid-mounted models for use on flat-bed or pick-up trucks.

Features claimed for the sprayers include one-man operation, positive dripless shut-off, automatic nozzle cleaning, interchangeable booms, and centralized control to provide finger-tip operation at all times. The booms are hinged to swing up and back to clear abutments, posts, or highway guardrails automatically; they return automatically to spraying position after clearing obstacles. The boom height is adjustable, and a master control unit permits spraying from either or both booms.

SprayRite booms are available in sizes to spray swaths up to 33 feet wide. Standard nozzle spacing is 18 inches, but both booms may be swung to the same side to overlap with a nozzle spacing of 9 inches. The booms fold and can be raised for traveling. Tractor-mounted units are operated from a power take-off; skid-mounted units are equipped with air-cooled 4-cycle gasoline engines.

Designed specifically for weed killers, this SprayRite unit can be installed on any standard wheel tractor. It is also available in a skid-mounted model for use on trucks.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 58.

Road, Oil Pipe Line Blazed Through Jungle

Development of New Guinea Wells Required Building a Service Road And a Pipe Line to Speed the Oil To Point of Shipment

✦ OIL is one of several valuable resources found on the jungle island of New Guinea. Though the New Guinea wells are not as productive as those in the United States, 9 out of every 10 drilled yield enough oil to make them economically worth while. Their development has been slowed, however, because there are not enough service roads to carry the men and materials necessary for exploring, drilling, and exploiting the wells—and because there has been no pipe line to carry the oil to tankers in the harbor.

In 1946, the New Guinea Netherlands Petroleum Co. issued a contract to F. H. McGraw & Co. to construct roads from its wells in the Klamono and Wasian regions to the Sorong and Steenkool harbors. During construction, the road between the Klamono field and the Sorong harbor was to be used as an access road for the laying of an 8-inch oil pipe line designed for an operating pressure of 700 psi.

The F. H. McGraw & Co. contract included clearing and grubbing sites for five construction camps and building 60 miles of road. Work was started in December, 1946.

Location

Photographic mosaics were assembled from regional surveys made by the petroleum company and from existing Army maps. From these aerial photographs, contour maps of the region were prepared on which the paper location of the road was made without benefit of any actual preliminary survey. This method of location met with great success, as practically no relocations were necessary in the field.

Clearing

The toughest part of the job was clearing the trees and the dense jungle undergrowth for a right-of-way 180 feet wide. The trees to be cleared averaged as many as 4,800 to the running mile. Native workers, equipped at first with portable power saws, were

A road takes shape in the jungles of New Guinea—a familiar sight to those readers who are veterans of the South Pacific. F. H. McGraw & Co. built this service road leading to oil wells of the New Guinea Netherlands Petroleum Co.

employed in the clearing operation. But this method was abandoned when it turned out to be too dangerous for the native workmen, and the clearing continued by hand methods with axes and machetes.

All trees 18 inches in diameter and under were cut down in this fashion. Anything over 18 inches was left standing, to be knocked over by bulldozers. However, bulldozers were not able to push the trees over fast enough, and McGraw's Project Manager, M. de la Torre, decided to blast the large trees and stumps with dynamite.

Drainage

The type of terrain through which the road was located was mostly low flats with a high water table. Before any rough grading could be done, a complete drainage system for these low areas had to be developed. It consisted mostly of cleaning the existing waterways and excavating large cut-off ditches so that surface water could drain from the right-of-way. The greater part of this work was done with power shovels operating on mats. Drainage structures were built of corrugated-iron pipe because of the facility with which this type of material can be transported.

Road Construction

The rough grading was done by bulldozers and scrapers. Soil encountered was a heavy plastic clay with a large amount of colloidal matter. This type of soil, and the extremely heavy rainfall in this region, made it almost impossible to obtain a consolidated subgrade except during the few months of the year when rainfall was light and the soil dry enough to be handled by the equipment.

The complete lack of any coarse-grain soils made it necessary to stabilize the subgrade with sand obtained from a near-by ocean beach. The material was windrowed and mixed in place by a motor grader. The wearing surface of the road consisted of a ½-inch seal of sand and crude oil.

Men, Equipment, Supplies

The project was completed in December, 1948, though it had been closed down during construction approximately 50 per cent of the time because of bad weather. Two crews were used—one working inland from Steenkool to Wasian, the other working from Sorong to Klamono. The 34 Americans employed by McGraw were augmented by 100 Dutch engineers, catskinners, and mechanics, and nearly 1,000 native laborers, most of whom were from Java and the Celebes. During construction, the McGraw force taught a group of Dutch and native personnel how to operate and maintain the equipment so they could keep the road in a satisfactory state of repair and continue with new construction.

Equipment used on the job was purchased by the petroleum company and shipped to New Guinea at the same

(*Concluded on next page*)

time as the McGraw forces. Most of it was war-surplus material which was already located in the Pacific. Fuel for driving the equipment was shipped in from a refinery in the Far East.

Food taken down by the McGraw crew lasted for about a year. Additional food required was shipped in from Australia. Fresh meat was obtained in the Celebes. Sickness—tropical malaria, dysentery, and skin disease—was a major drawback to the progress of the job. Lost time due to sickness added up to 6 per cent of the total working time. Malaria-control forces, medical care, and hospital facilities were handled by the petroleum company.

Project Manager

Mario de la Torre, in charge of the project from its inception, is a civil engineer with many years of experience in foreign countries. Previous to the New Guinea road project he worked on a highway in Bolivia for the McGraw company.

During the war, de la Torre was a key engineer on Pan American Airways' vast Airport Development Program in South America. While heading a party searching for an Army B-24 which had been forced down and abandoned in the jungles of Brazil early in the war, he was bitten by a bushmaster, deadly snake of the tropics. Fortunately, the snake bit him on the tip of his left index finger. Aware that the reptile's bite is lethal, he whipped out his revolver, shot off the end of his finger, let it bleed freely—and saved his own life. Pushing on through the jungle, the de la Torre party discovered the lost B-24 the next day.

Born in Quito, Ecuador, de la Torre received his education and training in the U. S. and South America. He attended grammar school in Baltimore, Md., and later studied at the University of Maryland. He received a B.S. degree in Civil Engineering in 1931. He also received a Bachelor of Philosophy degree from the Colegio Nacional Nejio in Quito.

De la Torre's engineering career has taken him from gold dredging in Colorado to highway construction in Maryland and from the States to South America, where in 1938 he helped make construction history on the Texas Co.'s 263-mile oil pipe-line project in Columbia. This was the memorable job on which a suspension bridge, vital to the project, was flown, piece by piece, many miles into the interior.

Narrow-Beam Light

A floodlight with a specially designed narrow-beam reflector is announced by the General Electric Co., Lighting and Rectifier Divisions, Schenectady 5, N.Y. Beam angle of the new floodlight is 20 degrees vertically and 24 degrees horizontally. It is recommended by the company for use where the light source has to be more than 150 feet from the area to be illuminated, or where long and narrow areas are to be lighted.

The floodlight has a maximum beam candlepower of more than 400,000, the manufacturer reports, and a beam efficiency of 47.5 per cent. It is an adaptation of the G-E L-69 and features a heat, weather, and impact-resistant front glass spun-sealed to the Alzak-processed aluminum reflector. Vertical and horizontal full-swing scales are marked in degrees to simplify positioning of the light and to make daylight adjustments possible. The unit also has a built-in rifle sight for precision aiming of the beam. The housing is removable for easy lamp replacement, and once the beam is adjusted, it will remain in position in normal service, reports the manufacturer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 44.

Natives from Java and the Celebes augmented the Dutch and American forces on the McGraw road-building project in New Guinea. Here, tractor cable is replaced in a typical job setting—jungle in the background, muddy clay under foot.

Data on Tractor-Shovel

A broadside on the Hough 76-hp tractor-shovel is available from The Frank G. Hough Co., 822 Sunnyside Ave., Libertyville, Ill. It features the positive action of the 4-wheel pneumatic-tire traction of the Model HM Payloader.

The broadside opens to 22 x 32 inches. It includes numerous action shots of the HM in use on digging, loading, grading, and carrying operations. Specifications cover the 1½-cubic-yard bucket, the power unit, and other design details. The broadside is entitled "Four Wheel Drive Is Here".

This literature may be secured from the company, or by using the Request Card at page 16. Circle No. 3.

Light-Duty Trencher Digs 18-Inch Ditch

A light-duty trencher has been developed as a companion tool for the J. I. Case Model VAI tractor by the Construction Products Corp., 4345 E. Imperial Highway, Lynwood, Calif. The Profit System trencher is designed to dig a ditch 12 to 18 inches wide and over 52 inches deep. Among the features claimed for it are its wheel construction, high clearance, hydraulic lift, heavy-duty chain drive, high-capacity buckets, and wedge-type reversible and replaceable bucket teeth.

The Profit trencher has eight forward creep speeds and two wheel speeds, providing sixteen forward digging combinations. A reversible conveyor is designed to discharge dirt on either side of the ditch. The unit will operate within 30 inches of curbs or other obstacles, the manufacturer states. Accessories available for use with it include hydraulic steering, dual rear tires, and all loader attachments.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 102.

Developed as a companion tool for the J. I. Case Model VAI tractor, the Profit System trencher digs ditches 12 to 18 inches wide and over 52 inches deep.

Chrome-Plated Tape Has Easily Read Face

A new chain tape is announced by the Lufkin Rule Co., Hess Ave., Saginaw, Mich. It is constructed from chrome-plated spring-tempered flexible steel, and is said to have a hard, smooth, non-glare chrome-white surface which will not chip, crack, or peel. The jet-black foot markings are deeply etched to make them easily read, Lufkin reports. Clips are riveted to line, with reinforcing strip, to help avoid end-of-line breakage. The tapes are supplied with two leather thongs.

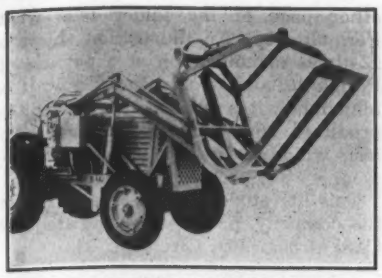
The Super Hi-Way chrome-clad drag tape is available with three types of end fittings and markings. Style C-9100 has a blank space at each end; Style C-9100A has measurements beginning and ending at the extreme outer ends of clips or rings; and Style C-9100B has a blank space at each end with an extra foot before the zero mark which is subdivided into 10ths and 100ths, numbered from right to left. In each of the first two styles, the first and last foot is subdivided into 10ths and 100th; all three styles have markings at 1-foot intervals. They also have a marking at 2 feet 4½ inches—one-half the standard railroad gage. All three are available in 100, 200, or 300-foot lengths. They can be supplied on a metal reel equipped with a hardwood carrying handle. Tapes over 100 feet have a 4-arm reel with D-handle and spike end.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 5.

A-C Managers Appointed

W. S. Barackman, formerly Assistant Industrial Sales Manager of the Allis-Chalmers Kansas City branch office, has recently been appointed Industrial Sales Manager of the company's Dallas, Texas, branch. Since joining the organization in August, 1945, he has held the post of Assistant Sales Manager at the Omaha branch, and, until recently, the same position at Kansas City.

J. M. Haile and R. F. Garity have just succeeded each other as Managers of the eastern and northwest industrial territories, respectively. James M. Liddy has been appointed Industrial District Manager for Minnesota, the Dakotas, and Iowa.



The new Shoveloader Models 4-AT, 4-BT, and 4-CT are equipped with a special fork attachment with a finger.

Fork-Lift Attachment

New Shoveloader models are announced by the Lull Mfg. Co., 3612 E. 44th St., Minneapolis 6, Minn. The Models 4-AT, 4-BT, and 4-CT feature a special fork attachment with a hydraulically controlled hold-down finger. Other features include fork-lifting control cylinders, three valve sections, three conveniently located control levers, and a rear ballast box.

The new models of Shoveloaders are built and completely assembled at the factory. Other loader attachments can be used with the new models by installing standard bucket-control cylinders to replace the lifting-fork cylinders. These alternate attachments include material buckets, combination coal and snow buckets, cranes, bulldozers, and independently powered sweepers.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 140.

New Jacketed Pumps

Jacketed pumps for handling petroleum products and other viscous or volatile liquids where it is necessary to heat or cool the liquid during pumping operations are manufactured by the Viking Pump Co., Cedar Falls, Iowa. They are available in four sizes with capacities of 90, 200, 300, and 450 gpm. The Viking pumps can be supplied as bare pump units, geared motor-driven units, V-belt motor-driven units, geared-head motor-driven units, flat-belt units, double-back geared units, and combination gear and V-belt motor-driven units.

The units feature complete individual jackets for the casing, head, and rotor-bearing sleeve. They are suitable for either cooling or heating, Viking reports, and will handle up to 125 pounds of steam pressure. Thanks to a new jacket on the rotor-bearing sleeve, the packing can be heated so that it retains its pliability; this prevents the liquids being handled from hardening and solidifying in the packing box, the manufacturer explains. The Viking pumps are supplied with either right or left-hand port connections.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 135.

Subsurface Investigation

Test borings for all types of subsurface investigations are made by The Giles Drilling Corp., 2 Park Ave., New York 16, N. Y. And a pocket-size folder describing the Giles service is available for distribution. This folder discusses the purposes and advantages of borings, and lists some of the features claimed for the Giles borings.

The folder describes the type of equipment and personnel employed by Giles, tells how the various soil-strata samples are bottled and labeled, and indicates the type of information provided with each sample: for instance, the type and number of hammer blows employed in obtaining each sample, the depth of strata penetrated, depth to ground water, and identification and classification of all soils sampled.

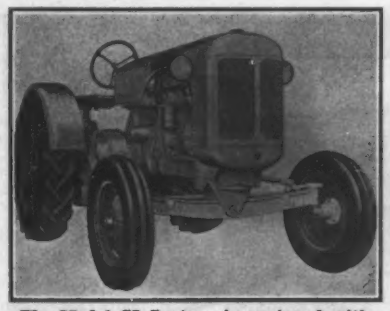
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 61.

Catalog on Compressors

Air compressors in several styles are in the subject of a 20-page catalog issued by The Wayne Pump Co., Fort Wayne 4, Ind. The Wayne line includes two-stage, low-pressure two-stage, and single-stage compressors with displacements ranging from 1.8 to 50 cfm. Bulletin 714-R covers all the items in the Wayne line and tabulates the capacity of each model, its horsepower requirements, maximum pressure, numbers of cylinders, bore and stroke, and tank capacity.

The bulletin pictures each model as well as the featured parts of the Wayne compressors, including the pistons, all-metal muffler and filter, large-area intercooler and aftercooler, tank drainer, constant-level oil system, and others. It also contains shots of the Wayne factory, a reproduction of the Wayne guarantee, and views of installations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 49.



The Model CI Centaur is equipped with a 25-hp engine and features a low center of gravity and short turning radius.

New Wheel Tractor Has a 25-Hp Engine

A 25-hp rubber-tired tractor is announced by the Le Roi Co., 1706 S. 68th St., Milwaukee 14, Wis. The Model CI Centaur has a 25-hp Le Roi Model D-140 valve-in-head engine with low piston speed and replaceable wet-sleeve liners.

Among the features claimed by Le Roi for the tractor are low center of gravity, short turning radius, uncluttered platform, ample clearance between seat and fenders, and room for the operator to drive the unit from a standing position. The crown of the fenders allows sufficient clearance for the use of high-lug snow or mud chains.

Attachments available for use with the CI include a loader, backfill blade, snow plow, rotary sweeper, utility boom, and winch. An all-weather cab is available, as well as solid tires, bumpers, and materials-handling equipment for indoor work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 99.

Heavy Truck Scales For Contractors' Use

Heavy-duty truck scales are manufactured by the L. R. Murphy Co., 1610 N. C St., Sacramento, Calif. Murphy contractors' scales are made in three standard sizes: the 20-ton-capacity unit has a 20 x 9-foot platform and a 25-inch overall depth; the 30-ton unit has a 24 x 9-foot platform and a 25-inch depth; the 40 to 50-ton unit has a 34 x 9-foot platform and a 29-inch depth. Scales with other capacities and different-size platforms are available on special order.

The scale can be hauled completely assembled, Murphy reports, by removing the tip end of the transverse lever at the bolted splice and tightening the four hold-down bolts. If necessary, the deck can be removed in 8-foot sections with the stringers remaining bolted in place.

The weigh beam is furnished with full-capacity or type-registering beam, short-iron pillar outfit, or all-metal beam box. Over and under indicators or automatic indication can be supplied. The all-steel construction of the lever system is said to prevent breakage even under extremely heavy loads. Tool-steel knife-edge pivots are set in machined pivot ways. The bearings are interchangeable.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 66.

Lightweight Aggregate For Plaster Described

A lightweight plaster aggregate is described in a 6-page folder issued by the Great Lakes Carbon Corp., 18 E. 48th St., New York 17, N. Y. Among the features claimed for Permalite are good workability, insulating action, fireproofing, crack resisting, and sound absorbing. Each of these features is described in detail in the folder.

The folder also contains a list of specifications and technical data on Permalite, as well as instructions for its use. These explain recommended mixes and applications, conjunctive materials, mixing, base and finish coats, acoustical treatment, and physical properties. Another page of the folder tells what Permalite is. An illustration shows a 12-times magnification of a particle of Permalite, and text explains how it is mined, how it is manufactured, how it is produced, and the research and field tests which have gone into its development.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 34.

Dust-free operation marks the Fireproofer dry-cut masonry saw. The dust is collected by vacuum and filtered through the special bag at right.

Masonry-Cutting Saw

A dust-free dry-cutting masonry saw is announced by the Martin Fireproofing Corp., P. O. Box 27, Buffalo 17, N. Y. It is designed to eliminate dust by means of a powerful vacuum unit which collects the dust-laden air and filters it through a special filtering bag. This vacuum collects the loose dust from the material being cut as well as the particles around the saw blade, the manufacturer points out.

The Fireproofer blade and the dust-collecting vacuum unit are powered by individual 1½-hp electric motors which operate on either 110 or 220-volt single-phase 60-cycle ac circuits. The saw is constructed as a single, welded, all-steel unit. Special features of its adjustable cutting table are simplified lock-release triggers; these, explains the company, enable the operator to cut any size, style, or shape of masonry unit quickly and easily.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 77.

Truck-Slung Road Hones

Truck-slung road hones for maintaining bituminous, gravel, stone, dirt, or cinder roads are described in a folder issued by The New England Road Machinery Co., 801 E. 6th St., South Boston, Mass. The catalog stresses several features claimed for the New England road hone, including speed, economy, flexibility, mixing action, adaptability, and durability.

The folder contains a photograph of the road hone accompanied by a list of specifications. These specifications cover the scraping width, distance between longitudinal I-beams, overall width and length, weight, hydraulic control unit, operating shafts, I-beams and cross channels, blade support angles, seven reversible blades, and the pulling, hanging, and side-sway chains.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 52.

Rotary Drier-Screener

A rotary drier-screener for sand and other inorganic free-flowing granular materials is described in a bulletin prepared by the Mines Equipment Co., Dept. A57, Clayton Ave., St. Louis 10, Mo. Bulletin RD-300 lists six features claimed for the Mines unit: it has a powered screw feed; the combustion chamber is fully insulated; incoming material is pre-heated by exhaust gases; three heating arrangements can be supplied; the unit screens as it drys; and it has a sturdy long-lasting power drive.

General construction and operating data are presented for the 2-hp electric power unit, the oil or gas-burning heating units, the screens, the bearings, and the frame. Line drawings show the construction of the Mines unit and its general dimensions. Described in detail is the action of the screw feed as it carries material from the feed hopper to the drying drum and the heating unit located at the discharge end.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 93.

Midget-Size Drill

A ¼-inch rotary drill is now available from Master Pneumatic Tool Co., Inc., Orwell, Ohio. The midget-size Model M-900 is 6⅜ inches in length and can be supplied with free speeds of 1,200, 2,400, and 4,800 rpm. It is powered by an internal-blade type of vibrationless motor.

Features claimed for the M-900 include simple construction for easy maintenance; pistol-grip handle and motor housing of special alloy heat-treated aluminum; an extra-large oil reservoir to provide constant lubrication through an automatic oiler while the drill is in operation; easy feathering of button-type throttle; standard-size ball bearings; and sturdy planetary gearing.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 19.

Convention Calendar

July 17-20—County Officials Meeting

Annual meeting, National Association of County Officials, Hotel Leamington, Oakland, Calif. NACO Housing Committee, Oakland, Calif.

Sept. 25-Oct. 2—Construction Exposition

Construction Industries Exposition, Houston Chapter, Associated General Contractors of America, Inc., Sam Houston Coliseum, Houston, Texas. L. W. Duddlesten, General Manager, or Russell W. Nix, Chairman, Exposition Committee, AGC Office Bldg., Gray and Crawford Sts., Houston, Texas.

October 3-5—Lubrication Meeting

Annual meeting, National Lubricating Grease Institute, Hotel Roosevelt, New Orleans, La. Harry Bennetts, Executive Secretary, 4638 Mill Creek Parkway, Kansas City 2, Mo.

October 10-14—AASHO Meeting

Annual meeting, American Association of State Highway Officials, Gunter Hotel, San Antonio, Texas. Hal H. Hale, Executive Secretary, 1220 National Press Bldg., Washington 4, D. C.

October 10-14—ASTM Meeting

West-coast meeting, American Society for Testing Materials, Fairmont Hotel, San Francisco, Calif. C. L. Warwick, Executive Secretary, 1916 Race St., Philadelphia 3, Pa.

October 24-28—National Safety Congress

National Safety Congress and Exposition, National Safety Council, Stevens, Congress, Morrison, and Sherman Hotels, Chicago, Ill. R. L. Forney, General Secretary, National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill.

November 2-5—ASCE Meeting

Fall meeting, American Society of Civil Engineers, Hotel Statler, Washington, D. C. Don P. Reynolds, Assistant to the Secretary, 33 W. 39th St., New York 18, N. Y.

Civil Engineers Sought For Coast-Guard Service

The U. S. Coast Guard is seeking immediately a limited number of civil engineers for commissions in its officer corps. Graduate engineers under 31 years of age, with practical professional experience, are needed. The maintenance of more than 22,000 fixed structures and shore establishments has placed a severe strain on its trained officers, the Coast Guard says, and the engineers sought will go into active service immediately.

The prime objective in this program is the selection of career officers. Commissions as Lieutenant (jg) or Ensign are available, depending on qualifications and experience. Interested civil engineers should write direct to the U.S. Coast Guard, Washington 25, D. C., for complete details.

Dravo Ups A. J. Morrison

A. J. Morrison has been named Manager of the Shaft & Tunnel Department of Dravo Corp.'s Contracting Division, Pittsburgh, Pa. He has been with the company since 1917, except for Army service during World War I.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York 16

Enclosed is my remittance of $3 for the next twelve issues of Contractors and Engineers Monthly.

Name .....

Position .....
(Or Type of Business)

Address .....

City .....
N. B., Cash, check or postage stamps will be entirely acceptable.

C. & E. M. Photos

All concrete for the Springs Cotton Mills project was mixed at the site and poured into wooden forms—even the concrete beds (left). But sleeping won't be as hard as it sounds when the beds are covered with U.S. Rubber Koylon Foam mattresses. Above, notice the completed bed, the concrete dresser slab at the right, and the wooden blinds, above.

Vacation Quarters Built for Employees

Durable Concrete and Tile Buildings Are Constructed on Ocean Beach; Maintenance Reduced to a Minimum

✦ THE Springs Cotton Mills, with headquarters at Lancaster in South Carolina, is constructing for the use of its employees a nine-building development along the ocean front, 4 miles south of Myrtle Beach, S. C. Eight of these buildings, each measuring 20 x 100 feet, will serve as quarters for the cotton-mill workers as they vacation at one of the best natural beaches on the Atlantic coast. The other and largest building, approximately 90 feet square, is designed as a recreation center. It will contain a cafeteria, soda bar, kitchen, and lounge. Work on the project started late in December, 1948, and by June 1 of this year accommodations were available for the first group of employees.

Each of the eight quarters buildings contains eight bedrooms. Two persons will share a room, thus establishing the initial capacity of the development at 128 employees. Ultimately, 25 quarters buildings will be constructed, grouped around the central recreational building. When that plan is realized, 400 employees can vacation at the beach resort at the same time.

Springs Cotton Mills employs thousands of workers at its various plants in the industrial hill country in the western part of the state. For many of these who will vacation at the resort, it will be their first visit to the Carolina Low Country. This strip of coastal plain has long been famous as a year-round beach resort, and the site selected for this development has great natural beauty. It is rimmed by generous-size sand dunes and covered with thick-growing bushes and trees.

The recreational project was designed by G. Thomas Harmon, a Columbia,

(Concluded on next page)

Vacation Quarters Built for Employees

(*Continued from preceding page*)

S. C., architect, and is being constructed by the Moore Construction Co. of Myrtle Beach, S. C. The buildings are of solid and durable construction to withstand the elements encountered along an exposed ocean front; the main building materials are reinforced concrete and tile. The design of the buildings also reduces maintenance to a minimum—an important consideration with the ever-constant turnover of vacationing employees.

Concrete Construction

The 20 x 100-foot buildings were built to the same standards, with concrete footings, a 4-inch concrete floor slab, and 8 x 8-inch concrete columns to support the 4-inch roof slab of vermiculite concrete. Around the edge of the roof slab is bolted a 2 x 6 which is covered with copper flashing. The slab itself is topped with composition pitch roofing material. The walls are of National Fireproofing hollow tile brick which will serve to insulate the buildings from the hot summer sun. All wood used is cypress, except the roof deck of the recreational building.

Each building actually consists of two units of four bedrooms. A partition wall extending out to the edge of the porch along the front of the building divides it in half. A built-in brick flower box is located at the center of the two porches. Each unit has a shower bath and toilet to serve the four rooms.

The rooms themselves are approximately 12 feet square, are entered through a wooden door opening on the porch, and have four windows. Two windows are in the front or porch side, while the other two are at the rear to afford cross ventilation. They have wooden shutters of the venetian-blind type, and are screened on the outside against insects. They contain no glass, but a plastic type of screen which drops down against the shutters from the inside gives protection against rain. The top interior of the rooms is painted white to relieve the severity of the concrete ceiling.

Equipment

Each bedroom has a wash basin built against one of the partition walls, with an electric light fixture above it. On the opposite side of the room is a concrete dresser—a slab 4 feet long x 1 foot 4 inches wide—projecting from the wall at a height of 2 feet 8 inches above the floor. Mirrors 16 x 20 inches will be fastened to the walls over the lavatory and dresser.

Along the sides of the rooms are two beds also of concrete construction. They are 6 feet 6 inches long x 3 feet 4 inches wide, and are 1 foot 8 inches off the floor. A 2-inch slab serves for the bed, and this is supported by three vertical thin walls. The end walls are 4 inches thick while the center support is 3 inches thick. This sleeping on concrete beds is not as hard as it sounds, however, for the slabs are to be covered with U. S. Rubber Koylon Foam mattresses, thick cushions of soft spongy rubber 4½ inches thick.

All the concrete for the job was mixed at the site in 2-bag mixers and poured into wooden forms. Even the concrete beds were poured in place. Slots were left in the vertical slabs so that wooden shelves might be inserted beneath the beds. The shelves can be used for storing suitcases, holding shoes, etc.

Obviously the buildings are fireproof, for there is practically nothing in them that will burn. The rooms can be readily cleaned by turning on a hose and flushing them out. There is nothing which can get out of order or be damaged either on the inside or outside; even the mattresses can be washed off with the hose. Maintenance charges will therefore be negligible.

A sewage system has been installed to carry refuse away from the development, inland across Ocean Boulevard in the opposite direction from the ocean, to tie into an existing main.

Personnel

During the peak of the construction, the Moore Construction Co. had as many as 50 employees engaged on the project under the direction of E. M. Lawton, Superintendent. L. J. Jordan is Resident Engineer for the Springs Cotton Mills.

Boilers in Twelve Sizes

Scotch boilers in sizes from 10 to 180 hp and from 1,400 to 25,000 square feet of steam radiation are described in a bulletin issued by The Brownell Co., 424 N. Findlay St., Dayton 1, Ohio. As special features, the Brownell boiler has a low construction for limited headroom; it needs no casing; and insulation is easy to install. The boilers are recommended by the company for power, heating, and processing.

Bulletin No. B-8 contains complete specifications for 12 models; it lists their horsepower rating, steam radiation, heating surface, size of safety valves, dimensions, furnace characteristics and volume, safety-valve information, etc. The catalog also contains a cut-away view of the boilers which indicates the location of parts and the type of construction.

This literature on Brownell boilers may be obtained from the company, or by using the Request Card at page 16. Circle No. 37.

Valve Lowers Hazards Of Air-Line Breaks

A new automatic shut-off valve, designed to eliminate danger from breaks in compressed-air lines, has been announced by the Olin Gas Engine Co., 9 Lafayette Ave., Buffalo 13, N. Y. Made to fit standard connections, this valve is inserted at the intake end of the air hose.

If a break occurs in the hose, the valve closes instantly, the manufacturer explains, and shuts off pressure, permitting only a light stream of air to escape through a by-pass. This prevents the accidents which often happen when a hose, under pressure, breaks and gets out of control.

This shut-off valve also makes it unnecessary to turn off a valve before making repairs. When the hose is repaired, the company points out, the pressure will equalize on both sides of the valve and a spring opens it automatically. It also permits workmen to change tools without shutting off a valve at the air line.

The valve is made of brass and will not corrode, Olin states. Also, it has only one moving part. It does not restrict the flow of air or reduce the volume of air being used, and it operates under varying pressures. It can be used for steam, gases, and light liquids flowing under pressure, as well as for air lines.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 51.

Forms for Roads, Airports

Steel forms for road and airport work are described in a bulletin issued by The Heltzel Steel Form & Iron Co., Warren, Ohio. Bulletin K-19 stresses such features as the upturned flange of the form, the exclusive stake pockets, the stakes, the extra-wide tread, and the hot-pressed lock joint.

Bulletin K-19 tabulates specifications for the 7/32-inch heavy-duty road forms, the ¼-inch military highway forms, and the dual-duty forms for airports and highways. The tables contain information on the height and base of the forms, their weight, and the weight of the stakes.

The bulletin tells of tests which have been conducted on the Heltzel forms, and explains how they have stood up under various types of loadings. It also describes available attachments, including the integral curb forms, the lip-curb extension form, header form, grooving strip, steel stakes, lifting hook, riser form, and stake puller.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 109.

One-Sack Concrete Mixer

A concrete mixer with a capacity of 9 cubic feet of mixed concrete is described in a bulletin available from the Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif. Among the features claimed for the Model 93 are sealed Timken bearings, all-steel bowl and yoke, silent multiple V-belt drive, air-cooled engine, cantilever springs, electrically welded frame, and six mixing blades. The bulletin illustrates each of the features in three sectional photographs.

Bulletin No. OCM also contains a list of specifications for the Essick One Sacker mixer. These cover the mixing bowl, yoke, 4-hp gasoline engine power unit, engine reduction gears, jackshaft bearings, king-pin bearings, transmission of power, wheels, tires, and weight.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 126.

Waukesha Advances Schulze

The Waukesha Motor Co., Waukesha, Wis., announces the appointment of Fred C. Schulze as Sales Manager. Mr. Schulze, who formerly was Assistant Sales Manager, joined the company in 1928.

The Trippe flasher light gives a warning signal in two directions. It flashes on and off 60 times a minute.

Signal Flasher Light

A flasher light which gives a warning signal in two directions is available from the Trippe Mfg. Co., 2608 W. 16th St., Chicago 8, Ill. It is for use on road-maintenance vehicles, snow plows, and other equipment where a warning signal is desirable.

The Trippe light is supplied with either 6 or 12-volt bulbs; with plain red, blue, or lettered lenses; and with full chrome construction. It is designed to flash on and off 60 times a minute.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 25.

Diesels for Trucks

Diesel engines for use with heavy-duty Mack trucks are announced by Mack Trucks, Inc., 350 Fifth Ave., New York 1, N. Y. Engines END 457, 510, and 672 are designed specifically for use with tractor-trailer combinations, 40,000 pounds gcw and up. They feature controlled combustion, low-peak pressures, precision timing, close-coupled fuel-injection pumps, and smoothness and economy of operation.

According to Mack, the combustion control provided by the engines results in a sustained pressure and a smooth piston thrust; it eliminates any hammer-blow effect on the pistons. The Mack Synchrovance is said to provide variable and automatic injection timing synchronized to the speed of the engine. The fuel-injection pump operates on a direct drive from the timing gearing, and can be removed without upsetting the timing of the engine, the manufacturer reports.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 41.

How Rubber Is Produced And How Tires Are Made

The story of rubber, from the gathering of the sap to the production of rubber tires, is told in an interesting booklet prepared by The Firestone Tire & Rubber Co., Akron, Ohio. The story deals with the first recorded observations of rubber, the way rubber is gathered and the latex is treated, and the steps in making rubber tires. It also contains a section on the development of synthetic rubber.

Booklet No. M305 tells how the tire body is made and describes the mixing of crepe rubber with other materials, gum-dipping and calendering, ply-cutting, assembling, forming, vulcanizing, balancing, finishing, and inspecting. It is thoroughly illustrated with photographs showing each of the steps involved.

The booklet also describes the Safti-Grip tire and lists features claimed for the complete Firestone line of tires. It covers the De Luxe Champions, the Imperial with nylon safety-cord protection, the Safti-Sured Life Protectors said to make a blowout as harmless as a slow leak, the complete line of truck tires made by Firestone, and the Champion Ground Grip tractor tires.

This literature may be obtained from the company's Public Relations Department at Akron, or by using the Request Card at page 16. Circle No. 63.

Westinghouse Changes

Three appointments have been announced by the District Engineering & Service Department of the Westinghouse Electric Corp., Pittsburgh, Pa.

H. E. Dralle, who will be located in the New York office, has been appointed Assistant Manager, Eastern Engineering & Service Division, to succeed S. L. Henderson who is retiring. D. E. Inman will become Manager, Northwestern Engineering & Service Division, upon the retirement of H. K. Smith. Mr. Inman will be located in the Chicago office. M. L. Gardner will, in turn, succeed Mr. Inman as Assistant Engineering Manager, District Engineering & Service Department.

Dozer-Loader Described

The Horn-Draulic loader, designed for mounting on Ford, Ferguson, and Ford-Ferguson, and Case wheel tractors, is described and illustrated in a bulletin available from the Horn Mfg. Co., Fort Dodge, Iowa. This twin-cylinder hydraulic loader has interchangeable blade and scoop attachments with which a variety of loading, digging, scooping, leveling, clearing, and piling operations can be handled.

Copies of this literature may be secured from the company. Or use the Request Card at page 16. Circle No. 133.

C. & E. M. Photos

A special rig made up to blend earth and moisture on the Davis Dam embankment was this "middle buster", or lister plow, and a Caterpillar D8. The plowshares were hard-faced to resist abrasion and the rig was mounted on a heavy steel frame to withstand stresses caused by pulling the plow through the soil.

Dirt Records Soar On Dam Embankment

(*Continued from page 3*)

row and stockpile pits, on an average.

During the month of February, work hit all-time highs for the job. This was the month which accounted for 1,150,000 cubic yards, and for the shift record of 33,000 cubic yards in place. R. G. Manning, Terry's Progress Engineer, has made a very interesting performance study of the power shovels during the peak month of February. This analysis shows what the machines did, compared with what was possible in the 27 working-day, 587-hour, 22-hour-per-day month. The analysis follows:

Shovel Description	Cubic Yards Moved	Operating Hours	Cubic Yards per Hour	Remarks
Bucyrus-Erie 54B	171,338	572	300	....
Northwest 80-D	137,115	561	245	....
Northwest 80-D	150,515	505	298	Major repairs
Northwest 80-D	173,120	569	304	....
Lima 1201	185,636	521	356	Light repairs
Manitowoc 2-yd.	42,746	323	132	Feb. 12-Feb. 25

Big Dewatering Job

One of the biggest dewatering jobs of the west was also a feature of the construction of the dam, because after the Colorado River had been diverted through the forebay channel by the upstream earth-rock cofferdam, the site had to be dewatered and kept dry. The river below the dam site was, of course, also blocked off by a downstream cofferdam.

Stang wellpoints did the dewatering job successfully. Some were hard to install, because of the presence of old gravel bars in the river. It was necessary in many cases to drive the wellpoints with a McKiernan-Terry 7B pile hammer to penetrate the gravel. Sand formations yielded readily to jetting.

Ground water never did quite leave the core trench, however, so a deep French drain was placed in the bottom of the core trench and a 16-inch perforated pipe was installed. After the fill had been placed up out of danger, this pipe and drain were grouted in to seal them completely.

Job Completes Embankment

Completion of the earth work finishes the main embankment. The embankment has a structural height of 200 feet

(*Concluded on next page*)

Dirt Records Soar On Dam Embankment

(*Continued from preceding page*)

and a height of 138 feet, is 1,600 feet long, 1,400 feet wide at its base, and 50 feet wide at its crest. A two-lane roadway connecting Arizona Highway 68 and Nevada Highway 77 will be built across the top of the embankment when the other work is finished. A contract for furnishing and erecting steel for the two-span bridge across the upper end of the forebay channel has been awarded. The 152-foot-high concrete bridge pier in this channel was completed in January.

Utah Construction Co. is the prime contractor on the $27,000,000 contract which includes the dam embankment, powerhouse, and spillway, with appurtenant works. Work was authorized on Davis Dam before World War II, but the contract was terminated after only minor work had been done. Utah Construction Co. received the second contract after World War II, and resumed work in April, 1946. It is expected that all work will be finished by July of 1950.

At the present time the spillway and the powerhouse intake structure are about 95 per cent complete, exclusive of the downstream stilling basin. The powerhouse is about 20 per cent complete. The spillway and intake will be finished this summer, and the powerhouse should be finished early in 1950. Installation of the generators, turbines, and other power-plant equipment will be carried on concurrently with work on the powerhouse. The first energy is expected to be generated in the late summer of 1950.

At present, the river at Davis Dam is being diverted through six openings left in the spillway structure. After completion of rock riprap facing on the dam and the installation of necessary gates to stop the flow, these six openings will be bulkheaded with stop logs, thereby raising the water in the diversion channel about 40 feet. During this stage the water will flow through two outlets, one on each side of the spillway. Radial gates controlling these two outlets will be initially operated to store water in the reservoir.

All power-plant equipment is on order and much of it has already been delivered to the dam site where it is stored, awaiting installation. With the first of five 45,000-kw generators scheduled to go on the line in 1950, construction of the backbone transmission lines is also being pushed to enable these facilities to deliver increasing quantities of power to Arizona, southern California, and southern Nevada.

The dam will create a reservoir of 1,820,000 acre-feet, extending up-river 67 miles to the tailrace of Hoover Dam. Named for Arthur Powell Davis, who, as Director of the Reclamation Service from 1914 to 1923, helped lay the foundation for the development of the Colorado River, the project will: (1) provide re-regulation of water releases from Hoover Dam for irrigation and domestic use in the United States, (2) serve as a regulating reservoir for water to be delivered to Mexico at the U. S.-Mexican boundary as required by provisions of the Mexican Water Treaty, and (3) produce electrical energy.

Personnel

The job was designed and administered under the general supervision of L. N. McClellan, Chief Engineer of the Bureau of Reclamation, and S. O. Harper and W. R. Young, former Chief Engineers of the Bureau. E. A. Moritz was Regional Director and H. F. Bahmeier was Construction Engineer.

Officials of the Utah Construction Co. who made the earth-moving phase roll like clockwork included Project Manager H. E. Williams, and General Superintendent T. L. Terry. Terry, who is known and liked far and wide wherever dirt stiffs gather, is a veteran of many dams and the Alcan Highway. His men refer to him as "the old man", or "Terrible Ted".

In addition to these men, Paul Newell was Project Engineer, W. T. Lloyd was Field Engineer, and R. G. Manning was Progress Engineer. H. Thiessen and G. Keplinger were the mechanics who directed repairs and equipment service. The dirt stiffs were headed by three shifters who did most of the fighting, including Dave Carter, Day Shift; Bill Matthews, Swing Shift; and Harris D. Ford, Graveyard.

Remember—Safety Is No Accident!

Block-Making Machine

Concrete-block machines are manufactured by The Gene Olsen Corp., 401 Grace St., Adrian, Mich. They are made in three sizes including the Gocorp King which produces 24 or more 8-inch blocks a minute; the Gocorp Senior, rated at 12 or more 8-inch blocks a minute; and the Gocorp Junior, described as a low-price vibrator for making the same-quality blocks as the larger machines.

Both the King and the Senior are completely automatic, including the pallet return and quality control, and both feature the O'Connor resonant vibration. The King uses double molds which permit the production of two sizes of blocks at one time. Both the King and the Senior use standard plain pallets and racks which hold three 8-inch blocks per pallet.

Further information on these block machines may be secured from the company. Or use the Request Card at page 16. Circle No. 57.

This is the revised Model OTC No. 970 universal sleeve puller, designed to pull sleeves on more than 200 makes and models of trucks and tractors.

Pulls Cylinder Liners

A revised model of the No. 970 universal sleeve puller is announced by the Owatonna Tool Co., 348 Cedar St., Owatonna, Minn. It is designed for pulling cylinder sleeves on more than 200 makes and models of trucks and tractors. The OTC tool is adjustable to provide clearance regardless of the position of the cylinder studs, the manufacturer states, and to simplify centering the tool over the bore. Adapter plates can be applied from the top. The long fine-threaded screw and heavy thrust bearing are said to eliminate friction and provide a steady pull.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 14.

Easy-Ride Truck Seat

A special easy-riding seat for trucks is available from the Monroe Auto Equipment Co., Monroe, Mich. The E-Z seat is completely self contained, says Monroe, and requires no brackets or special equipment for installing; it is mounted on a base which is easily bolted into place on most popular makes of trucks.

The smooth-riding qualities of the E-Z seat are said to derive from a Monroe double-action hydraulic shock absorber built into the seat frame, and to ball bearings which ride on a rigid guide bar. A variable-rate spring is designed to account for differences in drivers' weights. The seat is available in two models with either sponge-rubber or spring cushions.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 125.

Arthur S. Tuttle Dies

Arthur S. Tuttle, former Chief Engineer to the Board of Estimate and Apportionment of New York City, died on May 19 at the age of 84. When he retired from the City in 1933, he had completed 49 years of service during which he served as Deputy Chief Engineer, Chief Engineer, and Consulting Engineer.

Upon his retirement from the City, Mr. Tuttle was appointed New York State Director of the Public Works Administration. In this capacity he represented the Federal government in the construction of engineering projects totaling more than $800,000,000. He was Project Engineer for the Triborough Bridge, the Lincoln Tunnel, and the Queens Midtown Tunnel, as well as many projects throughout New York State.

During the war years, Mr. Tuttle was a member of an engineering firm which designed Camp Kilmer and Camp Shanks, as well as supplying construction plans for Camp Dix and Pearl Harbor and other military and naval installations. Since 1944 he had been Chairman of the Board of the Tuttle-Haller Companies. In 1935 he was President of the American Society of Civil Engineers, and in 1938 he was elected an honorary member, the Society's highest distinction.

Calibrated Dispenser For Entraining Agent

An improved dispenser for air-entraining agents is announced by J-W Materials, Inc., P. O. Box 288, Napoleon, Ohio. It is designed for use with Darex AEA, manufactured by the Dewey & Almy Chemical Co. Tank capacity is 5.6 gallons, which is said to be sufficient to produce approximately 150 cubic yards of 5-sack concrete using a ratio of one ounce of Darex AEA per sack of cement.

The J-W dispenser has a calibrated quadrant which can be set for various amounts of Darex AEA in ounces. A 3-way valve permits the air-entraining solution to flow from a supply tank to a container, and then up the vent line to the level of the liquid in the supply tank. The vent line, which is made of transparent tubing, permits visual inspection to determine whether the container is filled and whether there is adequate solution in the supply tank. The manufacturer recommends that the dispenser be placed adjacent to the water valve so that it discharges into the water line between the water valve and the mixer; or the Darex AEA may be discharged into the sand in the batch hopper.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 27.

Piers Being Built For New Toll Bridge

Span Over Kennebec River At Augusta, Maine, Will Unsnarl Traffic Now Using Old Low-Level Bridge

+ THE highly congested traffic condition through the streets of Augusta, Maine, will be greatly relieved by a new toll bridge now under construction across the Kennebec River. Augusta lies on both banks of the river, which at present is spanned by only a single low-level vehicular crossing to serve the capital city. Hills ascend from both sides of the river, with business and industrial establishments located in the lower sections of Augusta, and the residential area situated back on higher ground. Public buildings, shopping centers, and the heavier concentrations of population are on the west or right bank of the river, although the opposite side, or left bank, is also thickly settled.

Augusta, too, is something of a hub. Two Federal highways, U. S. 201 and U. S. 202, cross the river on the existing bridge. In addition, six state routes enter the city from the west, and five from the east. These various highway routes converge into the narrow hilly streets leading down to the river. With only a single span to handle the traffic, the streets of Augusta are quite naturally filled with vehicles which are backed up for blocks on both sides of the bridge.

Accordingly, the Maine State Highway Commission decided to construct another bridge across the Kennebec at Augusta—a long, high-level bridge connecting the high banks of the opposite shores. Traffic jams will be eliminated, since vehicles will not have to go down into the narrow, downtown streets with their many stoplights, intersections, and circuitous approaches to the old crossing which is wide enough for only two lanes and limited to 25-ton loads. The hills up from the river were also a hazard in the winter when they were covered with snow and ice. The new plan calls for a traffic circle high up on each bank, separated by 4,100 feet of bridge and approaches. This distance will be easily negotiated in a few minutes, against the half hour required to cross the river on the existing span during rush hours.

Toll Bridge

The new bridge will be a toll structure with the toll houses on the east side. The bridge itself is 2,092 feet long, measured from the center line of bearing of abutment 1 on the west bank to the center line of bearing of abutment 2 on the east bank. It is on a 35-degree skew, and the piers face up the river, which is normally about 750 feet wide between banks. The skew provides a clear waterway for the channel between piers 2 and 3, although the river is used but little for navigation. Except in the channel, the normal depth is 3 to 4 feet. Here in Augusta, 40 miles from the sea, the tides in the river average about 5 feet.

The substructure consists of the two abutments and ten piers numbered 1 to 10 from west to east—all constructed of reinforced concrete. The first seven spans in the same order measure 50, 250, 300, 350, 300, 250, and 116 feet 5 inches; the next three spans measure 117 feet 10 inches; and the eleventh measures 116 feet 5 inches. Span 1 from abutment 1 to pier 1 is a 50-foot I-beam span. The next five spans, totaling 1,450 feet, are deck arch trusses, with the largest being 350 feet between piers 3 and 4. The five spans remaining, from pier 6 to abutment 2, are of plate-girder construction. At pier 6 the line of the tangent ends, and the rest of the structure follows a 5-degree 24-minute curve extending beyond the east abutment 2.

Between piers 2 and 3, a 67-foot clear width of channel is provided for navigation, with a vertical clearance of 74.4 feet at mean low water; the finished grade of that span is 100 feet above the water. Designed for H-20 S16-44 loading, the bridge will accommodate a 28-foot roadway and two 6-foot sidewalks. The roadway will be a 6¼-inch reinforced-concrete slab covered with a 2-inch surface course of bituminous concrete, and crowned with a 3-inch slope in 14 feet. The railing is of wrought iron.

Two Main Contracts

The new bridge and approaches will cost approximately $3,000,000. Work on the foundation got under way in May, 1948, after the Maine State Highway Commission awarded a contract for the substructure to W. H. Hinman, Inc., of North Anson, Maine, on its low bid of $376,921. A contract for the steel superstructure was later awarded to the American Bridge Co., with offices at Boston, Mass., on a low bid of $1,063,056. The steel H-beam piling, on which all the piers with the exception of No. 10 are supported, was purchased by the State in the winter of 1947 from the Bethlehem and Carnegie-Illinois Steel Cos., in order to have the material available when the job was awarded and the contractor ready to begin operations. The contractor is paid for driving the piles.

All the substructures were completed by the end of the 1948 construction season, with the exception of pier 3 which is in the middle of the river. Since this pier was to be built from a trestle erected out from the east bank of the river, it was decided to hold in abeyance this last phase of the contract until the spring of 1949. For any trestle built during the winter would only go out with the ice in the spring break-up. The trestle will also be used by the iron workers in the erection of the bridge superstructure.

Steel erection started about April 1, 1949. The deck arch trusses are 25 feet apart on centers, and have 33-inch WF 130-pound floor beams. Over the piers the trusses are 50 feet high, and 18 feet at the center of the spans. On the other spans, plate girders with a depth of 8 feet 6½ inches back to back are used.

Piers and Abutments

Abutment 1 is founded on a solid stratum of gravel, and pier 10 goes down to ledge where it is anchored to the rock with dowels. The other piers and abutment 2 are supported on steel H bearing piles which vary in number and length according to the size of the structure. Pier 3, the tallest water pier at 62 feet, requires the greatest number of piles—99. They are also the longest and heaviest, being 14-inch H-beams at 89 pounds, and from 60 to 72 feet long. The other H-beams are 8-inch 36-pound, and 12-inch 53 or 74-pound. Before abutment 2 was built on the east bank, the approach fill was made, and the piles were driven through the embankment.

Piers 2, 3, and 4, the river piers, are the largest of the structures. Pier 2 has a footing which measures 53½ x 26 feet and is supported on 95 H-beam piles. The bottom of its 12-foot seal goes down to minus 18, and the pier is nearly 58 feet high. The 12-foot 6-inch seal for pier 3 goes down to minus 20, while the footing is 54 feet x 26 feet. Pier 4, 53 x 26 feet, rests on 92 H-beam piles with a 9-foot seal down to minus 12, and a pier height of 54 feet. Above the footings the piers step in an average of 2 feet, and have side walls battered ½ inch to the foot.

The river piers and pier 5 are solid structures for their full height. Pier 6 is solid for a height of 22 feet, then divides into two columns with a cap

(*Continued on next page*)

across the top. The remaining piers are separate columns all the way on individual pedestal footings. The number of piles under each of these pedestals varies from 9 to 16. Pier 5 and pier 6 are supported on 56 and 44 piles respectively. In the pedestal piers the shafts are 5 x 5½ feet at the top, and their tops are connected by an arched cap, 4 feet wide x 4 feet high at the center, and 6 feet high at the sides.

Pile Driving

Work started first on the east side of the river, and the piers were completed in this sequence—5, 10, 9, 4, 8, 7, and 6, determined by the order in which the piling was delivered to the job. The east approach, totaling 30,000 cubic yards of fill, was also placed, involving a 3-mile haul of material from a borrow pit. Then abutment 2 was constructed. Pier 4, which is in the river just off the east bank, was built with the crane used for pile driving and concrete handling. The crane was stationed on a scow which just fitted between the pier and the dock along the river bank. After pier 4 was completed, the sheet piling forming the cofferdam was pulled, and activities were shifted to the west side of the river for the construction of pier 2.

Pile driving from the water was done on a surplus Navy pontoon scow 73 feet long x 29 feet wide, of shallow draft and capable of handling over 100 tons. The scow consists of 48 individual steel pontoons joined together; each pontoon measures 5 x 5 x 7 feet. Timber guide piles were first driven into the river to mark the location of the cofferdam. Then a timber frame was floated into position to serve as a template for the driving of the sheet-pile cofferdam. The same framing served for all three river piers. The sheeting consisted of M-116 sections in 35 and 40-foot lengths which formed a tight closure. Bracing consisted of two 12 x 12 rings on 11-foot vertical centers, with a 6-inch I-beam running longitudinally through the cofferdam, and four 6 x 12's for cross-braces. The vertical supports were 6 x 6's.

The H-beam piles came in on the tracks of the Maine Central Railroad up on the bank overlooking pier 2. A stiff-leg derrick, with a 2-drum National hoisting engine, was set up near the tracks to unload the steel and lower it down to the pier. Steel was also delivered by rail to the east bank, and was trucked from the siding to the piers. Driving was done by either of two Link-Belt Speeder cranes with 65 and 75-foot booms and 50-foot swinging steel leads. For the 12 and 14-inch H-sections, a McKiernan-Terry 10-B-2 hammer was used, while for the lighter 8-inch beams the No. 7 hammer of the same make was sufficient. The sheeting was removed by inverting the No. 7 hammer and using it as an extractor.

The hammers were usually driven by a pair of coal-burning steam boilers. But the lighter sections were also driven on some of the structures by compressed air supplied by two Ingersoll-Rand 315-cfm compressors and one Chicago Pneumatic 110-cfm.

Pier 2

During the construction of pier 2, the crane with the 75-foot boom generally worked on the scow moored to the river side of the pier, while the other crane, with the 65-foot boom, operated on timber mats, supported on a work platform of 14-inch beams ramped out over the water from the river bank. The steel for the platform was earmarked for the pier 3 foundation. Before any driving was done, the cranes excavated the cofferdams with ¾ and 1-yard clamshell buckets, and dropped in a layer of gravel 2 feet thick. Even with this cushion, it was difficult to keep the piles in line while driving on the west side of the river through a stratum of hard gravel interspersed with boulders. They were driven to granite rock on the west side; on the east side they were driven to refusal through layers of clay and gravel into a soft micaceous gneiss ledge.

In pier 2 the 95 steel piles were 14-inch 89-pound sections in 45 to 56-foot lengths, with an average spacing of 2 feet 7½ inches x 2 feet 9 inches. They were designed for a direct load of 55

(*Continued on next page*)

C. & E. M. Photo

You're looking down into pier 2 of the new Kennebec River bridge. These cranes handled concrete buckets for the seal pour—one from a scow, the other from a platform.

C. & E. M. Photos

These views on the east bank of the Kennebec River show (left) pier 4 of the new bridge and the two cranes which have just been brought over from the west bank on the barge; and (above) the prefabricated forms for pier 7 lying out on the ground.

Piers Being Built For New Toll Bridge

(Continued from preceding page)

tons. Around the outside of the pattern the piles are battered 2 inches to the foot. The piles project 6 feet into the seal, while eight of these piles extend 5 feet farther up into the shaft of the pier. The latter method of bonding is used in all the river piers.

As the piles were driven and the excavation completed, the cross-bracing within the cofferdam was removed, as the structure was secure without it. Preparations then got under way for the seal pours which were the largest continuous concreting work on the project. The seal in pier 2 took 600 yards of concrete; in pier 3 the seal will require 650 yards. Seal concrete is non-reinforced, and was poured without forms against the sides of the sheeting. The pour was made under water with buckets that opened after they were lowered to the bottom.

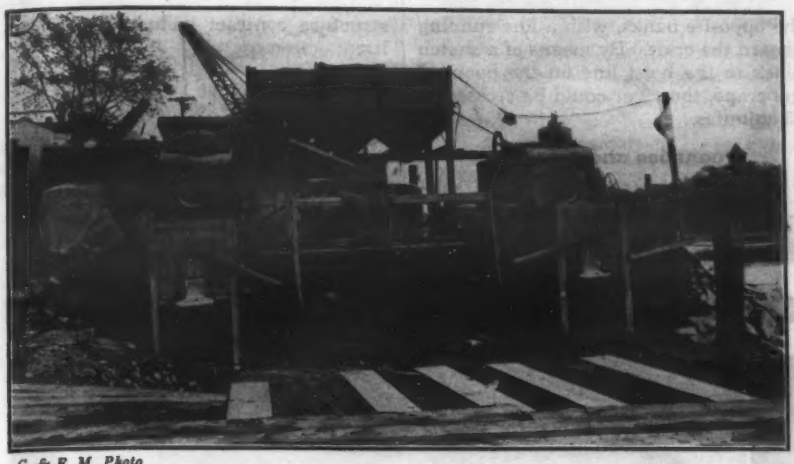
Because of the close spacing of the piles, the contractor made special buckets which could be lowered down between the H-beams. These buckets are 9 feet long x 18 inches square and hold 24 cubic feet of concrete, or two batches from a ½-yard mixer. As the concrete rose above the piles, other buckets measuring 3 x 3 x 3 feet and holding one yard replaced the long, slender buckets.

Concrete Plant

Concrete was mixed at a batch plant set up alongside each pier as it was being constructed. For piers 2 and 4, just out in the river, the plant was stationed at the edge of shore. Two CMC batch plants saw service on the project —one with a 2-compartment aggregate bin and the other with a 3-compartment bin—so that succeeding pours on different piers did not have to wait for the shifting of plants back and forth from pier to pier. Work on piers 2 and 4 was done with the 3-compartment batcher, with the middle bin holding about 9 yards of sand and the two outside bins each holding 15 yards of gravel.

Aggregate was supplied by V. E. Dunn & Son of Augusta, and was stockpiled behind the plant in wooden en-

(Continued on next page)



C. & E. M. Photo
This CMC 3-compartment batch plant with a Koehring 16-S mixer on each side was set up on the west bank of the Kennebec River for pouring the seal in pier 2.

closures holding approximately 100 yards of sand and 200 yards of gravel. A Link-Belt Speeder truck crane, with a 35-foot boom and an Owen ½-yard clamshell bucket, kept the batch plant loaded with aggregate. Additional material was furnished as needed, delivery being made by trucks that backed up a timber ramp to end-dump into the storage areas. Aggregate was weighed out into a bucket that moved along the batcher platform on an overhead trolley, and then discharged its contents into two Koehring 16-S mixers, one on either side of the plant. Gravel was drawn from the compartment nearest to the respective mixer.

On the other side of each mixer is a platform holding bags of Dragon air-entrained cement shipped to Augusta by rail from the mills of the Lawrence Portland Cement Co. at Thomaston, Maine. Delivery was made to Maine Central Railroad sidings on both sides of the river, and the bags were hauled to the batch plant in trucks. The bags were stored under tarpaulins, and added to the mixer skip by hand. Batches contained from 3 to 6 per cent of air according to the checks made in both the field and the laboratory. In the field the amount of air was determined by tests made with a Central entrained-air indicator.

City water was added at the mixer, and the concrete was discharged from the drums into hoppers holding about 2 yards of concrete. Concrete buckets were filled from gates on the hoppers, and the cranes then swung the buckets to the forms. Besides the buckets already mentioned that were used in the seal pours, Blaw-Knox 1-yard concrete buckets also saw service in the pier work.

The Mix

The gradation of the sand and gravel used in the concrete was as follows:

Sieve Size	Gravel		Sand	
	Per Cent Retained	Per Cent Passing	Per Cent Retained	Per Cent Passing
2½-inch	....	100	....	....
2-inch	1.6	98.4	....	....
1½-inch	20.9	77.5	....	....
1¼-inch	28.1	49.4	....	....
1-inch	18.1	31.3	....	....
¾-inch	16.2	15.1	....	....
½-inch	6.1	9.0	....	....
⅜-inch	3.8	5.2	....	100
No. 4	4.3	0.9	....	95–100
No. 8	....	....	6	94
No. 16	....	....	16	78
No. 30	....	....	35	43
No. 50	....	....	26	17
No. 100	....	....	13	4

For Class A concrete, such as that used in the columns, the mix was 1:190:370 pounds. Class B or mass concrete had the proportions 1:216:416 pounds. These two classes were reinforced, while the non-reinforced seal concrete had a 1:150:297-pound mix. On Class A and B concrete, 3-bag batches were mixed, with water added at the rate of 5.5 gallons to the bag. On the seal concrete, both 3 and 4-bag batches were used. The weights of typical batches were as follows for the seal work:

	3-Bag Batch		4-Bag Batch
Cement	282 lbs.		376 lbs.
Sand	471 lbs.		628 lbs.
Gravel	891 lbs.		1,186 lbs.
Water	(5.5-gal. bag) 137 lbs.		(5.5-gal. bag) 189 lbs.
	Total 1,781 lbs.		Total 2,379 lbs.

Form Work

With a seal pour on a river pier completed, the cofferdam was next unwatered for the construction of the shaft. Four Gorman-Rupp pumps were on the job—two 6-inch, one 4-inch, and one 2-inch. Usually 6-inch pumps were sufficient to pump out the water, with a 2-inch pump for puddles. Wooden forms that were made on shore were then set in place by the cranes in preparation for the next pour. The forms were

(Continued on next page)

C. & E. M. Photo
A Thor electric drill which holds the die stock cuts threads at the ends of the rods for the Williams Vibralock form ties. The cold-rolled steel rod is held in a pipe vise.

C. & E. M. Photo
Andrew Adams, left, is Resident Engineer on the Minman contract, and Howard B. Fleming is Superintendent.

Piers Being Built For New Toll Bridge

(Continued from preceding page)

built of 1¼-inch lumber. They were backed with 2 x 4 studs on 18-inch centers, and double 2 x 4 wales on from 18 to 36-inch centers, depending on the height of the pour and the speed with which the concrete was placed. The carpenter shop on the bank contained a DeWalt 12-inch roller table saw for the form work.

Williams Vibralock form ties were used to hold the forms together. Lengths of the cold-rolled steel, ⅜-inch diameter, were cut to the desired size and threaded in the field. As a substitute for the slow hand work of bolt threading, a somewhat unique use was made of a Thor electric drill. The steel rods were clamped in a pipe vise fastened to a workbench, while the desired size of die and die stock was fitted into the business end of the drill. The die was then placed against the end of the rod, the drill turned on, and in a matter of seconds the rod was threaded.

Forms for the shafts were built in a novel manner. They were completely fabricated, with the reinforcing steel in place, before they were erected for the pier pours. The forms for the long tapered shafts on piers 6, 7, and 8 were built full length and then sawed in two at the point where the reinforcing steel was spliced. After they were cut in sections, the reinforcing steel was hung in place. The steel was furnished by the Bancroft & Martin Rolling Mills of Portland, Maine, and was delivered to the job by trailer truck. The forms for the arches were also prefabricated, then lifted into position by the cranes.

These sections had to be strongly constructed since the original piece was in some instances as long as 50 feet x 8 feet square before being cut in two. The steel was set as the forms lay out flat on the ground. The heavy rods were not hung from the form ties, but to a sturdy frame of 6 x 6's that was fastened to the top of the section. Near the top of two opposite sides of the form, a steel plate was bolted with a hole in the end projecting above the form. The plate was of ½-inch steel, 5 inches wide x 7 feet long, and served as a pick-up. The cranes were equipped with a yoke made from an 8-foot length of 8-inch I-beam with clamps to pass through the holes in the two steel plates on the forms. In order to lift to the higher shafts, the crane with the 65-foot boom was fitted out with a 20-foot jib to increase its length. Some of the sections, complete with steel, weighed from 7 to 8 tons.

Water Cure

The concrete was brought up in the forms in 5-foot lifts, and vibrated as it was placed with Jackson hydraulic Hydro-Spades. The concrete was cured with water applied from soaker garden hose for a 10-day period. Forms were stripped after 5 days. The exposed surfaces were then gone over carefully with bushing hammers, a grout mixture was painted on, and the concrete was dressed down by Ingersoll-Rand pneumatic surfacers. Four of these tools were driven by a 110-cfm compressor. Sasgen scaffolds were hung from the piers for the finishers.

Pier No. 3, constructed this spring in the middle of the river, was reached by a timber trestle running out from the eastern shore of the river in order to avoid the deeper waters of the channel. The trestle was designed for H-15 loading and was 12 feet wide. Concrete was mixed on the river bank and hauled out in buckets on trucks. The scow with the crane was moored alongside the pier, and the concrete buckets were lifted from the trucks to the forms.

The scow was moved back and forth across the river on a cable fastened to the opposite banks, with a line running aboard the craft. By means of a snatch block to the hoist line on the boom of the crane, the river could be crossed in 15 minutes.

Quantities and Personnel

The major items in the $376,921 substructure contract include the following:

Excavation	14,500 cu. yds.
Borrow for east bank fill	33,400 cu. yds.
Stone blanket at river piers	2,340 cu. yds.
Concrete seal, piers 2, 3, and 4	1,646 cu. yds.
Concrete in unwatered forms	6,583 cu. yds.
Reinforcing steel	161,110 lbs.
Driving 550 H-beam piles	24,066 lin. ft.

(Concluded on next page)

The principal item in the $1,063,056 American Bridge Co. contract for the superstructure is the 6,192,000 pounds of structural steel.

W. H. Hinman, Inc., of North Anson, Maine, the contractor on the substructure, was represented by Howard B. Fleming, Superintendent. For the Maine State Highway Commission, Andrew Adams is Resident Engineer, assisted by Charles Savage and Edward Murrell. A force of from 50 to 60 workers is employed on the project. Vaughan Doggett is Resident Engineer in charge of the highway construction.

The Highway Commission is headed by Lucius D. Barrows, Chief Engineer. Max L. Wilder is Bridge Engineer, E. L. Merrill is Principal Highway Engineer, and R. M. Page is Assistant Highway Engineer.

Air-Entrained Concrete; Its Pros and Its Cons

A series of articles on air-entrained concrete is being distributed by the Hercules Steel Products Corp., Galion, Ohio. The articles were written by J. A. Nicholson, well known authority on concrete and President of the Nicholson Concrete Co., Toledo, Ohio.

In his articles, Mr. Nicholson presents the pros and cons of air-entrained concrete as he sees them. He examines every phase of the subject, including mixing equipment, controls, testing equipment, aggregates, location of central-mixing plants, and other overall conditions and factors involved. He gives advice on how to set up a system to make air-entrained concrete a practical and economically feasible venture.

The chemical and physical aspects of air entrainment are completely explained by Mr. Nicholson. He presents statistics to show that properly mixed, properly delivered, and properly placed air-entrained concrete is workable, plastic, cohesive, and uniform throughout. He also describes the problems of delivery and placement, and lists the requirements for delivery equipment, such as the Aircreter air-entrained-concrete dump body manufactured by Hercules.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 29.

Reinforcing-Steel Ties

Bar ties for use with reinforcing steel are described in a catalog distributed by Ankortite Products, Inc., 2020 Broadway, Parsons, Kans. The catalog contains complete information on the sizes of ties and the quantities in which they are packed. Also described are four types of Ankortite twisters. These include a spiral twister for heavy work, spring-return twister, spiral twister for light work, and a pistol-grip twister.

The catalog contains a table on bar ties for various rod combinations, listing the road sizes and length of tie for use with each.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 22.

Staff Changes at LeRoi

Recent personnel changes in the sales department have been announced by the Le Roi Co. of Milwaukee, Wis. Thomas V. Shea has been named General Sales Manager; J. E. Heuser, Industrial Engine Sales Manager; E. F. H. Dutton, Eastern District Manager; and Clyde R. Schuler, Sales Engineer for industrial engines.

Mr. Shea, formerly Eastern District Manager, succeeds J. M. Dolan who is now Vice President and General Sales Manager of the Hydraulic Press & Equipment Mfg. Co., Mt. Gilead, Ohio. Mr. Dutton, formerly in the Le Roi Foreign Sales Department, replaces Mr. Shea. Mr. Schuler comes to the company after twenty years with the Hercules Motor Co. of Canton, Ohio.

The Ottawa trencher digs trenches 10 to 18 inches wide in depths to 6 feet.

New Trenching Machine

A light-duty trenching machine is announced by the Ottawa Mfg. Co., 624 King St., Ottawa, Kans. According to the manufacturer, the unit will dig trenches from 10 to 18 inches wide and 6 feet deep, with special equipment available for deeper digging. It is powered by a 31-hp 4-cylinder air-cooled Wisconsin gasoline engine.

The Ottawa trencher has a road speed of up to 18 mph and a range of several digging speeds. Its maneuverability enables it to be used in congested or restricted areas, the company explains. A special feature claimed for it is the generous use of ball and roller bearings; these are equipped with seals to retain lubrication, seal out dirt and grit, and to prolong bearing life.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 35.

MM Supervisors Meet

A special meeting of Minneapolis-Moline industrial supervisors was held at the home office at Hopkins, Minn., May 2-10, to coordinate industrial sales efforts. The meeting was attended by the recently appointed MM industrial supervisors: C. W. Spigener, Frank Hughes, O. W. Walters, M. E. Carroll, Robert Moore, Ed Titus, E. W. Anderson, O. A. Nelson, C. A. Brogle, and W. H. Pratt.

The program included a visit to the Lull Mfg. Co. where the proper use of Lull Shoveloaders mounted on Minneapolis-Moline industrial wheelers was demonstrated. A highlight of the meeting was a trip to the MM automotive plant where the industrial wheelers and power units were observed in all phases of manufacture and assembly.

Manufacturers of allied equipment cooperated in making the meeting a success. Companies whose representatives demonstrated their equipment included: Allen Industrial Products; American Hoist & Derrick Co.; Davenport Besler Corp.; Henry Mfg. Co., Inc.; Little Giant Products, Inc.; Ottawa Steel Products, Inc.; and Reese Engg. Co.

Hercules Branch at Odessa

Hercules Motors Corp. of Canton, Ohio, has opened a new factory sales and service branch in Odessa, Texas. A well rounded stock of gas, gasoline, and diesel power units and Hercules engine parts will be maintained, for prompt service to customers in the area.

The new outlet augments the factory branches and retail stores already in operation in Los Angeles, Calif.; Salem, Ill.; Houston and Kilgore, Texas.

Les Petter, Minneapolis-Moline Special Project Engineer, directs the attention of MM industrial supervisors to features of the SMRI industrial highway mower, at a recent company meeting held at Hopkins, Minn.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York 16, N.Y.

Enclosed is my remittance of $3 for the next twelve issues of CONTRACTORS AND ENGINEERS MONTHLY.

Name _____

Position _____
(Or Type of Business)

Address _____

City and State _____

N. B. A dollar bill, check or postage stamps will be entirely acceptable.

Motorized Buggies Speed Concrete Job

Architectural Concrete Hauled 400 Feet to Pour As Contractor Doubles Water-Plant Capacity

By RAYMOND P. DAY,
Western Editor

✦ A PECULIAR concrete-handling problem has been solved in connection with the enlargement of the 100-mgd-capacity softening and filtration plant of the Metropolitan Water District near La Verne, Calif. Distances up to 400 feet, mostly over new concrete, were covered by motorized concrete buggies to account for an average of 100 cubic yards of building-type concrete per 8-hour day.

L. E. Dixon Co. of San Gabriel, Calif., did the work under a $2,592,400 contract with the Metropolitan Water District. The job included construction of new mixing and settling basins, sand filters, zeolite softeners, salt-storage basins, and a spur-track extension.

The existing main influent and effluent conduits and meters, and the head house and administration building, were built to accommodate the ultimate plant capacity of 400 mgd. The existing filter wash-water tank, carbonation basins, and main pumps are adequate for half the ultimate capacity.

The Dixon Co. job will duplicate the other existing facilities which were constructed to provide one-fourth of the ultimate requirements, and thus will double the present water capacity of the plant to 200 mgd.

Metropolitan Water District furnished the required cement, electrical wire and cable, major items of equipment, and zeolite mineral. When the job is finished this summer, the cost of the new improvements will stand at about $4,000,000.

It was a cut-up job in which most of the 21,000 cubic yards of concrete had to be poured in walls 12 inches thick or less. Repeated re-sets of buggy falsework were necessary, and at no point in the job was it possible to sustain heavy concrete production. By using the motorized buggies, Dixon poured the first 15,000 cubic yards according to his ambitious timetable which placed the job two months ahead of schedule by the autumn of 1948.

Description of Structures

Two units of mixing and settling basins were built. Each of these units consists of a settling basin 200 feet square, plus a mixing basin 200 x 50 feet. The existing settling basins are equipped with Dorr radial-type sludge collectors; the new basins are to be equipped with Link-Belt drag-type cleaners, with replaceable redwood flights. They will also have rotating paddle-type mixers similar to the existing ones, except that the new machines have wood paddle blades instead of steel.

The contract calls for 12 rapid sand-filter units, each 32 feet 2 inches x 72 feet 6 inches in size. They are the downflow gravity type, and will permit water to pass down through 2 feet of sand and 2 feet of gravel before being collected by the perforated vitrified-clay-pipe underdrainage system and conducted to the filter effluent conduits.

The zeolite softeners included in the contract are of the upflow type, consisting of 12 concrete beds 20 feet 9 inches x 30 feet 2 inches. They are similar in basic design to the ones now in use, although they have space for 40 per cent more volume of zeolite. They will have the means for semi-automatic regeneration and backwashing.

Five new salt-storage basins are being built, each basin measuring 42 feet 2 inches x 41 feet 4 inches. Reinforcing steel in these structures is a minimum of 3½ inches from the face of the concrete. Darex air-entraining agent is used in the concrete.

Organizing the Job

The job was organized under the general direction of W. L. Squiers of the L. E. Dixon organization, with Roy Knapp as General Superintendent. Knapp is a builder with almost four decades of building experience behind him, from Michigan to California.

Parts of the job called for specialty contractors, so the first arrangements were for subcontracts. C. G. Willis &

(Continued on next page)

A water-softening and filtration plant near La Verne, Calif., undergoes enlargement—here is some of the mixing and settling-basin work which L. E. Dixon Co. is doing for the Metropolitan Water District. That's a Noble 450-ton batch plant at the right.

The $2,592,400 contract also includes construction of these new salt-storage basins, each 42 feet 2 inches x 41 feet 4 inches in size. In the background is the outdoor carpenter yard where the intricate forms could be built before being hauled out to the job.

Motorized Buggies Speed Concrete Job

(*Continued from preceding page*)

Sons of Los Angeles subbed the structural excavation and earth work. Shannahan, Inc., was the subcontractor for the spur-track extension. Ceco Steel Products Corp. of Los Angeles handled the furnishing, bending, and placing of nearly 5,000,000 pounds of reinforcing steel and steel sash work.

A joint-venture subcontracting firm composed of Ofcco Construction Co., Inc., of Long Beach, and Pacific Pipeline & Engineers, Ltd. of Los Angeles was awarded the major plumbing, piping, and hydro-pneumatic systems. Structural steel and miscellaneous metal work went to Jackson Iron Works, Newbery Electric Corp. got all electrical work, and the painting and enamel work went to J. P. Carroll Co. and Parker Engineering Co. These were the principal subcontracts.

A main yard was set up on the job, very nearly in the center of the work. In this large area, ample storage was provided for pipe, valves, machinery, and supplies. A welding shop for pipe assembly was also located there, plus a huge outdoor carpenter yard where the maze of various forms could be prefabricated before being hauled out to the job.

This carpenter yard was amply supplied with power equipment for rapid form construction. It included such items as Comet and DeWalt ripsaws, a Delta band saw, Thor electric hand saws, and a Clark sanding machine to dress facings perfectly smooth. Concrete specifications were rigorous and required a very high type of work.

A Noble 450-ton automatic batch plant was also brought in and set up just east of the mixing and settling basins. This plant consisted of a receiving hopper at ground level for aggregates and sand, an endless bucket chain conveyor to charge the bins, a four-

(*Continued on next page*)

C. & E. M. and Metropolitan Water District Photos

This view from overhead shows the new water-softening zeolite building under construction.

At closer range, the zeolite softeners—their reinforcing steel in place—look like cages in a zoo. The softeners consist of 12 concrete beds 20 feet 9 inches x 30 feet 2 inches.

In the sand-filter beds, pipe installation was a huge job, and poured-in connections made forming especially difficult.

Metropolitan Water District Photo
Access runways 10 feet wide speeded form construction and materials handling on the Dixon job. This view shows the filter building and mixing basin.

compartment 450-ton aggregate bin, a 500-barrel bulk-cement silo, and automatic batching facilities.

Riverside bulk cement, furnished by the Metropolitan Water District, was delivered to the plant by truck carriers and stored in the cement silo. Sand and rock were secured from Pacific Rock & Gravel Co. of Monrovia, which delivered the material by truck to the receiving hopper. L. E. Dixon Co. owns a fleet of truck-mixers, and several of these machines were assigned to the job to take batches at the plant, mix the material 6 minutes, and deliver it to transfer hoppers on the job.

While these arrangements were under way, C. G. Willis & Sons began excavating for the new structures. A 2-yard Northwest dragline, with a fleet of rented trucks, removed most of the adobe and gravel material. The dirt was very much in demand for fill material in the near-by country, so it was all disposed of within a 3-mile radius of the new plant. A Bucyrus-Erie 22-B dragline was also used for some time on this part of the work.

Concrete Methods

All forms for concrete consisted of plywood facing, nailed to 2 x 4 studs, with double 2 x 4's for wales. During the first part of the job, a plastic coating was used on the panels, but certain characteristics of this material under sunlight were such that its use was discontinued. Fuller's form facing was substituted, and was used throughout the balance of the project, according to the job officials.

The form panels were brought out to the work site, set up by a truck crane or by hand, and fitted. There was always considerable carpenter work to do on the job, in addition to that done in the yard, because almost all the layout was intricate and tricky. The presence of extensive embedded metal items such as pipe, elbows, fittings, and sleeves also complicated the form work. The forms were held together by CP steel form ties, with nuts ouside the wales.

The truck-mixed concrete was brought as close to the pours as the heavy trucks could come; then it was dumped to a Gar-Bro transfer hopper. Wooden runways, supported on falsework, carried the four Gar-Bro power buggies which poured the concrete. These runways also were made in panels so they could be disassembled easily and moved from place to place.

The record which these power buggies established for themselves was good. Let's listen to Roy Knapp tell it. Knapp claims that the growth of concrete technology is like the growth of a man's children—commonplace to the person close at hand but amazing to the casual outsider.

"With the old type of push buggies, men just couldn't stand the long haul under this blistering sun last summer," he explained. "But they can ride these power buggies without getting tired. On one of the hottest days of the year, we clocked the machines one hour. It was 390 feet from the hopper to the pour, and they were hauling 9 cubic feet at a load. Each machine was making a round trip all that distance in only 95 seconds!

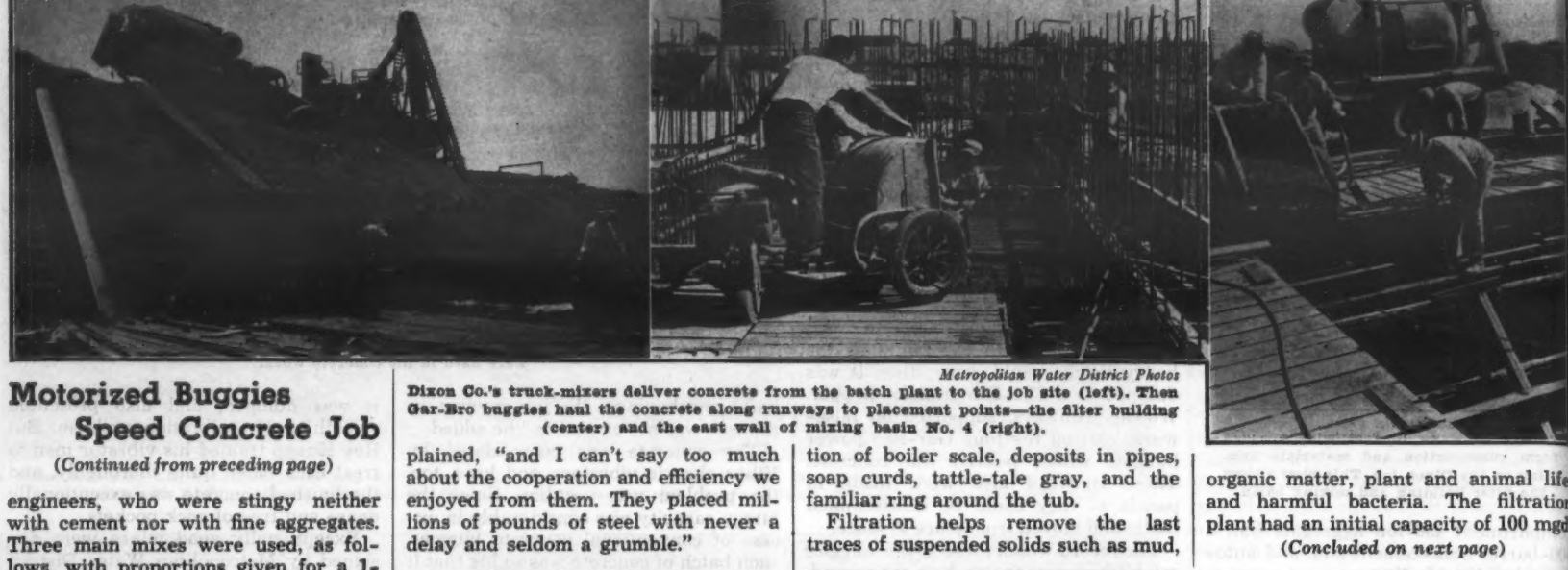
"The machines required some mechanical maintenance, of course, but we had a mechanic on the job anyway, so the cost was not excessive," he added.

The concrete was consolidated by Viber electric vibrators, and here, too, the problem was peculiar. Since the buggy capacity was considerably in excess of conventional concrete buggies, each batch of concrete was so big that it put a strain on forms and bolts when it was dumped, and also presented something of a vibration problem. But Roy Knapp trained his vibrator men to treat each batch quite thoroughly, and the finished concrete was exceptionally dense and free of rock pockets.

Exceptionally good mixes were designed by Metropolitan Water District

(*Continued on next page*)

C. & E. M. Photo
Workmen in the Dixon carpenter yard assemble the prefabricated form panels which were used in the concrete work.



Metropolitan Water District Photos

Dixon Co.'s truck-mixers deliver concrete from the batch plant to the job site (left). Then Gar-Bro buggies haul the concrete along runways to placement points—the filter building (center) and the east wall of mixing basin No. 4 (right).

Motorized Buggies Speed Concrete Job

(Continued from preceding page)

engineers, who were stingy neither with cement nor with fine aggregates. Three main mixes were used, as follows, with proportions given for a 1-yard batch:

Cement	6	sacks
Sand	36	per cent
Pea gravel, ¾-inch	14	per cent
Aggregate, 1-inch maximum	50	per cent
Cement	5.8	sacks
Sand	35	per cent
Pea gravel, ¾-inch	12	per cent
Rock, 1-inch	38	per cent
Rock, 1 to 1½-inch	15	per cent
Cement	5.5	sacks
Sand	32	per cent
Pea gravel, ¾-inch	12	per cent
Rock, 1-inch	34	per cent
Rock, 1 to 1½-inch	22	per cent

The concrete floors were finished off with metal strike-off screeds, wood floats, and steel trowels. A Whiteman power finisher was also used to advantage. The walls and baffles were all cured with water for 14 days. Exposed slabs were cured for the same length of time with Sisalkraft blankets, and the exposed concrete below ground, which would receive backfill later on, was cured with Sealtex watertight curing membrane.

By scheduling pours and form work very closely, and by working on all the structures simultaneously, the Dixon forces were able to beat their schedule slightly despite the thin walls, extensive forming, and long concrete-hauling distances from the edge of the pour to the point of placement. Exceptionally good synchronization of subcontractors' work was also needed.

"Ceco Steel Products Corp. had the most critical sub-item," Squiers explained, "and I can't say too much about the cooperation and efficiency we enjoyed from them. They placed millions of pounds of steel with never a delay and seldom a grumble."

Water for the Cities

Completion of the tremendous project will be another milestone in southern California's long battle for ample water. It is a semi-arid region whose average annual rainfall is only 15 inches—far less than is required for agricultural development or the needs of modern industrial cities.

The search for a water supply dates back to 1913, when the city of Los Angeles began importing water from the Owens River through a 238-mile aqueduct. Since that time, the Metropolitan Water District has built one of the largest domestic water-supply systems in the world. It is bringing water to southern California from the Colorado River, the last remaining source for large importations.

Its aqueduct extends across the entire state of California, and will be capable of delivering a billion gallons of water per day. The aqueduct—including Parker Dam, five giant pumping stations, reservoirs, miles of tunnels, canals, conduits, and siphons—is one of the great construction projects in the nation's history.

In order that this supply may be as excellent in quality as it is abundant, the water is softened and filtered before it is delivered to the domestic consumers. The softening process removes or reduces the dissolved substances which make water hard and cause the formation of boiler scale, deposits in pipes, soap curds, tattle-tale gray, and the familiar ring around the tub.

Filtration helps remove the last traces of suspended solids such as mud, organic matter, plant and animal life, and harmful bacteria. The filtration plant had an initial capacity of 100 mgd,

(Concluded on next page)

C. & E. M. Photo
W. L. Squiers (left) of L. E. Dixon Co. discusses the water-plant job with Superintendent Roy Knapp in front of the field office.

and is designed to be increased ultimately to 400 mgd.

The hardness in Colorado River water, averaging about 345 ppm, is due to the presence of calcium bicarbonate, calcium sulphate, and magnesium sulphate in solution. Softening is accomplished by reducing the calcium and magnesium in these three compounds to the point which proves most desirable to the consumers, or about 125-ppm total hardness. Lime, the most efficient softening agent, is used to remove the calcium bicarbonate from the water, but it does not reduce the hardness resulting from the calcium and magnesium sulphates. In this plant, the calcium and magnesium present as sulphates are removed by means of zeolite.

As the water enters the plant through the head house, lime is added in sufficient quantity to convert part of the calcium bicarbonate to calcium carbonate. The chemical reaction between the lime and the calcium bicarbonate takes place in large flocculating basins similar to those built under this contract. The reaction is helped along by gentle, rolling agitation.

The calcium carbonate produced by the chemical reaction is insoluble, and when the water passes slowly through the settling basins it settles to the bottom. The clarified water is drawn off at the top of the basins over skimming weirs. In the settling basins there are sludge-removal mechanisms which sweep slowly over the bottom area; these collect and make possible the continuous removal of settled, insoluble calcium carbonate.

After settling, the water flows through rapid sand filters which remove final traces of suspended matter and make it sparkling clear. From the time the water leaves the filters it is protected from any possible contamination.

The filtered water flows through a covered conduit to a point near the administration building where it is divided into two portions. One portion passes through zeolite softeners where the remaining hardness, due primarily to the calcium and magnesium sulphates, is completely removed. The other portion is by-passed and remixed with the completely softened portion in the conduit, which carries the finished water back into the aqueduct. By increasing or decreasing the percentage of completely softened water, the hardness of the final blended product can be adjusted and controlled.

The plant, operating at 200 mgd, will produce about 125 tons of calcium-carbonate sludge per day.

Personnel

The work was designed and supervised by Julian Hinds, well known engineer who is the General Manager and Chief Engineer of the Metropolitan Water District of Southern California. R. B. Diemer is MWD's Chief Operation and Maintenance Engineer in general charge of construction. H. J. Mills is Construction Engineer in charge of the project. R. A. Skinner is Office Engineer in charge of design. J. M. Montgomery was consultant. The operation of the softening and filtration plant is under the direction of W. W. Aultman, Water Purification Engineer.

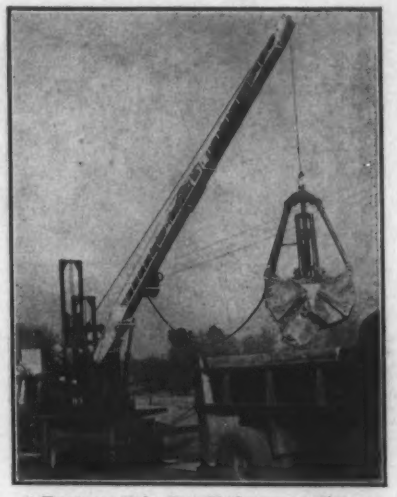
Help insure America's security and your own. Buy U. S. Savings Bonds.

Saw Serves 12 Purposes

A machine described as a complete woodworking shop is the subject of a 4-page folder prepared by The Master Woodworker Mfg. Co., 407 E. Fort St., Detroit 26, Mich. The folder features illustrations of the machine making twelve different types of cuts: crosscutting, cutting off and dadoing, compound miter cuts, mitering, routing, tenoning, ripping, bevel ripping, molding, plowing, jointing and boring.

The Master Woodworker is made in eight models, and specifications are listed for all of them. The specifications cover the gasoline or electric power units, bearings, size of saw blades, ripping capacity and speeds, crosscutting capacity, size of table, jointer, and weights and dimensions. Also listed is the standard equipment provided with each unit. The bulletin contains a complete description of the machine.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 82.



A Bucyrus-Erie H-3 Hydrocrane digs a sewer trench for the town of Greenfield, Wis. Note the pressure line from the boom to the ⅜-yard clamshell bucket which digs hydraulically. W. Laszynski, Inc., of Milwaukee, Wis., is the contractor on the job.

These concrete test molds come in two sizes: 6 x 12 inches and 8 x 16 inches.

Concrete Test Molds

Concrete test molds are manufactured by the Moline Iron Works, Moline, Ill. These test cylinders are available in two sizes: one is 6 inches in diameter and 12 inches long; the other is 8 inches in diameter and 16 inches long.

Moline explains that these molds are made in its own foundries, of high-strength refined malleable iron, that they are accurately machined and honed with precision to exact size; and that they produce a concrete specimen which is precise for laboratory testing. The wing nuts and swing bolts are made of bronze.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 7.

Truckers' Safety Posters

As one of its contributions to the nation-wide campaign towards encouraging safe, courteous driving and building goodwill for the trucking industry, The Mack Truck Co. is offering free of charge 8½ x 11 posters spotlighting 15 safety and courtesy rules to be observed by truck drivers. Good attention-getters, with their bold illustrations, these posters are suitable both for display and for distribution to truck drivers.

If you can use some, address the Editor, "Mack Bulldog", Mack Trucks, Inc., 350 Fifth Ave., New York 1, N. Y., or use the Request Card at page 16. Circle No. 132.

Macco Buys Pipe-Line Co.

The Signal Pipe Line Construction Co., which has been actively engaged in the construction of utility and oil lines in the southern California area for the past 20 years, has been purchased outright by the Signal Pipe Line Corp., a subsidiary of the Macco Corp. B. M. Laulhere, who has been connected with the pipe-line industry for many years, will head the new Signal Pipe Line Corp. as Vice President and General Manager.

Present operations are continuing from the head office on Signal Hill and branch offices at El Monte, Colton, and Palm Village, Calif. Additional branch offices will be set up as plans for expanded operations are carried out.

New Caterpillar Plant

Caterpillar Tractor Co., Peoria, Ill., recently dedicated and geared for full production its new diesel-engine factory. With a total area of 925,000 square feet, the building was designed, erected, and equipped expressly for the economic manufacture of the company's line of diesel engines. The structure houses facilities to produce all of the company's line of diesel engines, merchandised as industrial power units, marine engines, and electric sets. It measures 1,120 feet long and 757 feet wide.

The assembly area consists of three assembly lines for basic engines; two for erection, testing, painting, and shipping of industrial engines; a test room; and large areas for the storage of finished parts, both purchased finished and machine-shop finished. All three basic-engine assembly lines run parallel and end in the same bay, where a bridge crane is used to remove the engines to a set of gravity roller conveyors along which they are moved by a drag chain into the test room and stored pending test.

The diesel-engine factory is the first major milestone in Caterpillar's post-war expansion program. Devoted exclusively to the manufacture of diesel engines to power the company's diesel track-type and wheel-type tractors and diesel motor graders, and to serve as well as stationary power units, the building permits integration of manufacturing processes and the expansion of facilities in older areas of the Peoria plant.

Controls on Bucket For Precise Spotting

New bucket controls for the Multi-Foote concrete paver have been brought out by The Foote Co., Inc., a subsidiary of Blaw-Knox Co., Nunda, N. Y. Mounted on the bucket itself, they are for use in conjunction with the Multi-Foote HighLift boom. They permit smooth operation of the bucket doors for any degree of opening, the company explains, and allow the delivery of anything from a shovelful to the full load of the bucket.

According to the manufacturer, the position of the controls on the bucket itself permits the man spotting the bucket to do so with a high degree of accuracy. This is a great advantage, the company points out, when feeding direct to a Pumpcrete, where the whole bucketload cannot be delivered at once, and where the feed must be watched. It is also useful in pouring concrete into hoppers, spouts, concrete buggies, or other material handlers which do not require the full bucket capacity.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 40.

Precision Pump Control

Precision control for pumps is described in a booklet put out by Cutler-Hammer, Inc., 480 N. 12th St., Milwaukee 1, Wis. This 37-page booklet discusses C-H control for domestic, commercial, and industrial water systems. Specialized data are presented on accurate and efficient control units for domestic water systems, deep wells and small compressors, deep-well pumps and large compressors, standard-duty sumps and tanks, etc.

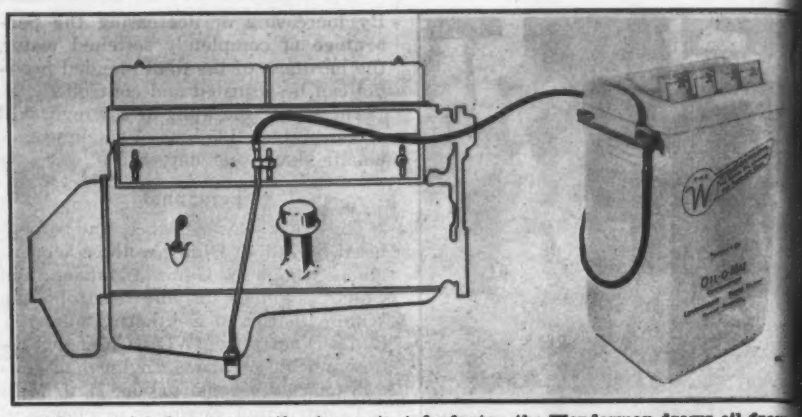
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 88.

Small-Capacity Scrapers

Small-capacity earth-moving scrapers are described in a 4-page folder available from The Soil Mover Co., Columbus, Nebr. The hydraulically controlled Soil Movers are made with wheels behind or alongside the scraper. The Model 100 has a 30-cubic-foot capacity and a 54-inch width of cut. The Model 200 has a 40-foot capacity and a 72-inch width of cut.

The folder describes and illustrates several features claimed for the Soil Mover units, including hydraulic action, large capacity, continuous operation, and ability to load, carry, or dump. Another feature, described in detail, is the ability of these units to dump backward; spotting is easier as a result, the folder explains, and there is less chance of stalling the tractor.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 54.



With a special clamp connection to a patented adapter, the Wonderman draws oil from a crankcase in a few seconds. It deposits fresh oil from its supply bank by a simple nozzle release. The Wonderman holds 20 quarts of fresh and 40 gallons of waste oil.

Oil-Changing Unit

Oil changes can be made in a short time without removing the crankcase drain plug, explains the Oil-O-Mat Corp. of Longmeadow, R.I., describing its new Wonderman unit. According to the company, the device permits oil changing or crankcase flushing automatically by a flip of a switch.

The Wonderman is a portable unit which can be wheeled to car, truck, or other equipment. It has a special clamp connection which is fitted to a patented crankcase adaptor located on the engine. To refill the crankcase, oil is pumped from an oil tank through a simple nozzle release. The Wonderman holds 20 quarts of fresh oil and 40 gallons of waste oil.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 18.

ws oil from
by a simple
f waste oil.

ortable unit
car, truck,
as a special
s fitted to a
r located on
rankcase, oil
k through a
Wonderman
oil and 40

be secured
the Request
. 18.

pecial in use
about 5 time
pace of time
ion profits -

AMS STREET
ILLINOIS

ir-Cooled
g a Rex
Michigan.
d on the
. . pre-
men who
such as
unning in
coupling
rrect and

ormation!

ATION
d Engines

e the

quest Cards

tween

ges 16 & 17

Obtain

rther

formation

Printed

tter on

y Product

dvertised

Described

ditorially

This

ue

Use the
Request Car
Between
Pages 16 & 1
To Obtain
Further
Information
or Printed
Matter on
Any Produc
Advertised
or Describe
Editorially
in This
Issue

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Contract Not Ambiguous But Sub Misunderstands

THE PROBLEM: *A written proposal bound subcontractors to excavate, compact, and rough-grade an area at an Army air base. It provided: "This work shall be paid at the unit price of 39.6 cents per cubic yard as according to the engineers' estimate. . . . The compacted sub-base, which we will call the top 9 inches of the subgrade, . . . shall be paid for as a sub-base at 72 cents per cubic yard as according to the engineer's estimates."*

Were the subcontractors entitled to 39.6 cents for all of the excavation, plus an additional 72 cents for the top 9 inches of subgrade?

THE ANSWER: No, decided the United States Circuit Court of Appeals, Eighth Circuit. (Maryland Casualty Co. v. United States, 169 Fed. 2d 102.)

Applying fundamental rules of law governing the interpretation of contracts, the court decided: The contract was not ambiguous as to the rates payable for the specified kinds of work to be done, and therefore neither required nor permitted extraneous testimony. The subcontractors impliedly bound themselves to conform to the applicable provisions of the specifications forming part of the general contract. If a written contract shows on its face that it completely covers the parties' agreement, one party cannot introduce testimony to show that it is not complete. Where a written contract is complete, the parties are presumed to have abandoned previous oral understandings not incorporated into the written contract. The phrase "as according to the engineers' estimates" must be read in context with the entire contract, without regard to what the phrase might be deemed to mean according to accepted trade meaning when used in another context. The courts will reform a contract to make it mean what it was mutually intended to mean, when through mutual mistake the contract fails to express that intent. The particular contract could not be reformed by a court because of the subcontractors' mistaken belief as to the rate of payments the general contractor was to receive for the particular work.

Interpreting the contract as written and adopted by both parties, the court decided that the subcontractors were not entitled to 39.6 cents for all excavating and compacting, plus 72 cents a yard for the top 9 inches of subgrade. They were entitled to only 39.6 cents per yard for excavation and compaction other than that involved in the top 9 inches of subgrade, and 72 cents per yard for the 9 inches.

The Federal Labor Law And Foreign-Base Jobs

THE PROBLEM: *Were employees on a project to construct a Bermuda military base covered by the overtime provisions of the Federal Fair Labor Standards Act?*

THE ANSWER: Yes. (Vermilya-Brown Co., Inc., et al. v. Connell et al., decided December 6, 1948, by the United States Supreme Court by a five to four vote.)

The decision turned upon the question of whether or not a military base maintained on foreign soil under lend-lease provisions is to be regarded as a "possession" of the United States, within the meaning of a statute that extends the Act's applicability to commerce among states, territories, and "possessions" of the United States.

The majority opinion, written by Justice Reed, concluded:

"When one reads the comprehensive definition of the reach of the Fair Labor Standards Act, it is difficult to formulate a boundary to its coverage short of areas over which the power of Congress extends, by our sovereignty, or by voluntary grant of the authority by the sovereign lessor, to legislate upon maximum hours and minimum wages. Under the terms of the lease, we feel sure that the House of Assembly of Bermuda would not also undertake legislation similar to our Fair Labor Standards Act to control labor relations on the base. Since citizens of this country would be numerous among employees on the bases, the natural legislative impulse would be to give these employees the same protection that was given those similarly employed on the islands of the Pacific.

". . . we have pointed out that the power rests in Congress under our Constitution and the provisions of the lease to regulate labor relations on the base. We have also pointed out that it is a matter of statutory interpretation as to whether or not statutes are effective beyond the limits of national sovereignty. It depends upon the purpose of the statute. Where, as here, the purpose is to regulate labor relations in an area vital to our national life, it seems reasonable to interpret its provisions to have force where the nation has sole power, rather than to limit the coverage to sovereignty. Such an interpretation is consonant with the Administrator's inclusion of the Panama Canal Zone within the meaning of 'possession'.

"We think these facts indicate an intention on the part of Congress in its use of the word 'possessions' to have the Act apply to employer-employee relationship on foreign territory under lease for bases. Such a construction seems to us to carry out the remedial enactment in accord with the purpose of Congress."

The dissenting opinion, written by Justice Jackson and concurred in by three other Justices, was summarized by him in the following words:

"Congress made the Act applicable in our 'possessions'. There is no indication or reason to believe that, had Congress considered the matter, it would have regarded our ten-

(*Concluded on next page*)

Avoid Legal Pitfalls

(Continued from preceding page)

ure in the Bermuda base as creating a 'possession', or would have applied an Act regulating private employment to an area where no such private enterprise could exist. There is no indication of a purpose to apply the Act to an exclusively military operation; indeed the Act indicates the contrary by exempting Government employees from its operation.

"It would not concern the United Kingdom, or the Colony of Bermuda, if the United States should require its contractors to pay overtime, upon any assumptions which do not imply a possession adverse to theirs. But I do think it will cause understandable anxiety if this Court does it by holding, as matter of law, that the leased areas are possessions of the United States, like those we govern to the exclusion of all others. Such a decision by this Court initiates a philosophy of annexation and establishes a psychological accretion to our possessions at the expense of our lessors, not unlikely to be received in more critical quarters abroad as confirmation of the suspicion that commitments made by our Executive are lightly repudiated by another branch of our Government. It should be the scrupulous concern of every branch of our Government not to overreach any commitment or limitation to which any branch has agreed."

The result of the majority decision is that the Supreme Court upholds a decision of the United States Circuit Court of Appeals, Second Circuit, (164 Fed. 2d 924), which in turn upset a decision of a lower court (73 Fed. Supp. 860) that the Fair Labor Standards Act did not apply to the Bermuda military base job.

Joint Liability on Job When Motorists Injured

THE PROBLEM: *Motorists were injured when the employees of a paving subcontractor left a paving machine on part of a road open to travel. On the facts detailed here, were the general highway contractor and the paving subcontractor jointly liable for the injury?*

THE ANSWER: Yes, decided the Appellate Division of the New York Supreme Court, Appellate Division, Third Department. (Osgood v. D. W. Winkelman Co., 87 N. Y. Supp. 2d 110.)

The prime contract made the contractor liable for injury resulting from negligence, to persons or property during progress of the work, and it required that barricades and signs be erected to warn travelers, etc.

The court decided that the evidence justified a jury in concluding that the paving subcontractor negligently left the paving machine unlighted on the highway. But the prime contractor was also negligent in failing to supervise the work properly and see that the paving work was carefully done to avoid danger to the traveling public. This duty was important because the paving subcontractor was engaged merely to complete the top course of the road. He did not assume the general contractor's obligation to maintain proper safeguards, etc.

As between the prime contractor and the subcontractor, their respective negligent acts were so inter-related that the prime contractor could not require the subcontractor to reimburse him for damages awarded against him in favor of the motorists.

A Comptroller General Had No Veto Authority

THE PROBLEM: *Was the Federal government justified in refusing to pay for work completed according to the terms of a naval construction contract, and to the satisfaction of the Navy Department, because of disapproving action of the Comptroller General, who was not a party to the contract?*

THE ANSWER: No, decided the United States District Court for the District of New Jersey. (John H. Mathis Co. v. United States, 79 Fed. Supp. 703.)

The court said that when a contracting officer representing a department of the Government has agreed with a contractor as to the amount due the latter, it would be unjust to require the contractor to begin anew a quest for pay with some other officer or department or official, and to abide by its or his opinion as to what is just compensation. This "would be to add a provision that certainly was not within the minds of the contracting parties and which would be manifestly unfair, and for this court to condone it, equally unjust."

The court cited decisions of the United States Supreme Court, to the effect that a contract may bind the Government to pay such sums as are found by the contracting officer to be due the contractor. The court also cited a decision of the Supreme Court that the Government is as much bound by the terms of its contracts as is any other contracting party. (United States v. Beuttas, 324 U. S. 768.)

Bid Notice Defective But Contract Not Void

THE PROBLEM: *Under a local statute, notice that bids would be received to furnish culverts for a county road should have been published for four successive weeks, with the first publication at least 30 days before the day for opening bids. A notice was published only three times, with the first only 17 days before the bidding date. Was a contract awarded under such notice void, in the sense that the contractor could not collect a balance due on the contract price?*

THE ANSWER: No. (Northwestern Sheet & Iron Works v. Sioux County, N. Dak., 36 N. W. 2d 605, decided by the North Dakota Supreme Court.)

The decision turned upon evidence showing that both the county authorities and the contractor acted in good faith, and without intent to stifle bidding. The court distinguished the case from other cases where there was culpable disregard of statutory requirements concerning competitive bidding, and where it was sought to collect the contract price without regard to the reasonable value of the work or materials furnished.

The court concluded that the county board attempted in good faith to comply with the law, that the purchase of the culverts was within the board's power, that they were received and used by the county, that they were worth what the county agreed to pay for them, and that equity and good conscience therefore required that the county pay the balance due on the contract.

Liability for Injury To Third Party's Men

THE PROBLEM: *The owner of a steam shovel, having sold it, directed his fireman to assist the buyer in loading it on a trailer. The shovel fell off, through negligence of the buyer's employees. Under Pennsylvania law, could the fireman disregard his right to claim an award against his employer under the Workmen's Compensation Act and, instead, sue the buyer for damages, on a theory that the fireman did not become a temporary employee of the buyer?*

THE ANSWER: Yes. (Quick v. Allegheny Const. Equipment Co., 65 Atl. 2d 238, decided by the Pennsylvania Supreme Court.)

The court applied the general rule of law that an employer may lend an employee to a third person, as affecting liability for injury to him, but that there can be no such lending without the worker's consent, which was not given in this case.

Right to Written Notice Of Work Changes Waived

THE PROBLEM: *Prime contractors acted on oral notices given by the subcontractor. Did they therefore waive a subcontract provision that written notice by the subcontractor of changes in work would afford the basis for extra pay?*

THE ANSWER: Yes. (Continental Surety Co. v. Schaefer, 173 Fed. 2d 5, decided by the United States Court of Appeals, Ninth Circuit.)

Foundation Work Starts a New Bank

(*Continued from page 1*)

Has Inside Fire Tower

In many respects the design of the new structure is unusually modern. For example, it will have fire protection from the inside, in the form of an inside fire tower. Protection will be so complete that the building will need no outside fire escapes, in contrast to many of the older buildings in the city.

The building measures 140 x 122½ feet. It rests on 56 separate reinforced-concrete footings 14 feet below street level. The reinforced-concrete building foundation extends about 13 feet below street level, which made necessary the removal of about 11,000 cubic yards of excavation.

Extending ten stories above the street, and topped by a two-floor penthouse, the new structure is to be built in alternate panels of brick and Bedford building stone. Brick panels are to be 6 feet high; the Bedford stone panels will be 5 feet 8¼ inches. Concrete and terrazzo floors are to be laid on a rather new type of light, strong steel flooring called Robertson Q-Flooring. This consists of structural-steel members which will be spot-welded to the main structural members. The members are so shaped that electrical duct work and conduits are easy to place.

Granite blocks for the street-level base of the new building are to be furnished by Cold Spring Granite Co. of Cold Spring, Minn. Cary Furst of Bedford, Ind., will furnish the Bedford stone. The building will use some Truscon steel sash, while the remainder of sash work will be Adlake double aluminum.

The erection of structural steel has been subcontracted to John H. Maxwell of Forth Worth. Stupp Brothers of St. Louis is furnishing the structural steel. Excavation work has been subcontracted by James McKnight of Amarillo, and that work was virtually complete. The only other subcontract which had been arranged when CONTRACTORS AND ENGINEERS MONTHLY visited the job was for elevators; this had gone to Westinghouse Electric & Mfg. Co.

Excavation Starts Jobs

When subcontracting negotiations were under way in connection with structural excavation, Jim McKnight estimated that the main block of structural material could be excavated in 20 days. He roughed out the 13½-foot-deep block of earth work in exactly 21 days, including minor additional excavation for the footing forms.

Bank Building & Equipment Corp. Photo

During foundation work for the First National Building in Amarillo, this test load of 94-pound bags of cement was placed to check deflection of a test pad on the dense clay subsoil.

McKnight used a Koehring Model 205 shovel, with a ½-yard PMCO dipper, to excavate the material. Hauling equipment consisted of 12 dump trucks, mostly Fords, of 4-yard capacity. A small motor grader was used to keep the excavation floor cleaned up, but it did not see steady service by any means.

The material lay in well defined layers. The upper 2 feet was black topsoil. Then came about 2 feet of reddish hardpan, which was the most difficult to dig. From that point on down to the bottom of construction the formation was a light colored clay. A power shovel could dig it easily enough, but later on, when a small amount of hand trimming was necessary, the workmen found it tough going.

The excavation was handled in two lifts: a 6-foot bank was taken in the first pass and a 7½-foot cut in the second level. This roughed out the main block of excavation.

One of the hardest problems connected with this excavation was the disposal of the soil. Arrangements had been made to truck the material to several school playgrounds where scuffing feet and weather had worn off the ground surface. In this respect it was wonderful for backfill. The problem was that of hauling.

Traffic on Mondays and Saturdays in Amarillo is something of a problem to a dirt contractor trying to move his trucks through the city on a 2-mile haul. Monday is "Dollar Day" in most of the Amarillo stores. On Saturday the people for miles around just naturally come to town. McKnight's operations on Monday were usually slowed to a crawl, and on Saturdays he sometimes had to knock off at noon. Even so, his average daily output in 9 hours with his Koehring shovel was about 500 cubic yards.

On this job McKnight solved a little problem which had plagued him for some time. Trip cables on the shovel dipper were parting much more often than McKnight figured they should. An intensive investigation showed that the oiler was getting a little too much crater compound on the shipper shaft, and that the compound then built up on the trip cable and caused it to jump

(*Concluded on next page*)

C. & E. M. Photo

This photo of steel form panels in place on the Amarillo First National Building job shows how the panels are held together by thin steel tie bars.

C. & E. M. Photo
A gang cleans and oils steel form panels stripped from a pour on the new Amarillo First National Building being built in Amarillo, Texas.

Foundation Work Starts a New Bank

(Continued from preceding page)

the sheave and part. When the oiler began using less crater compound, and keeping the trip cable clean, the trouble stopped.

After the main block of excavation was removed, the machine was changed to a backhoe in order to dig the foundations for the 56 columns in the building. This work was carried on while forming and concrete were started on the other part of the substructure.

Steel Form Panels Used

While rough forming for the 56 footing pedestals was made in the field out of 2 x 12-inch lumber, all structural concrete aside from this is being formed with small steel form panels. These panels were furnished to the job by the Dallas office of Economy Forms, Inc., of Des Moines, after a thorough analysis of the plans.

The forms consist mainly of 30-inch-square steel panels which can be pinned together rigidly by plate clamps and liner clamps. Smaller odd sizes of the panels are also being furnished so that any pour on the job can be assembled in a short time. One pour 14 feet high x 100 feet long was formed starting Tuesday morning. The forms were finished on Thursday, the pour was made Friday, and the forms were stripped and cleaned on Saturday.

When assembled, the panels are held together by thin steel tie bars, greased before the pour so they can be pulled out of the concrete. The thin slot is then filled with neat cement.

In setting the forms, upright 2 x 4's usually on 6-foot centers are used as a guide for line, and the panels are built up row by row by the carpenter gang working on both sides of a wall of steel reinforcing previously set. When a pour is formed, tied together, and braced, it is checked by a surveyor's instrument before the pour.

Concrete Is Truck-Mixed

A batch containing 4½ sacks per cubic yard is being used on the footing pours, while a 5-sack mix is used on the substructure walls. Arrangements have been made with Fyfe Cement & Supply Co. of Amarillo to supply the concrete from its commercial plant and deliver it in a fleet of truck-mounted mixers.

Truck-mixers can reach all the concrete work directly, with the exception of the south wall along Eighth Avenue, where a pedestrian walkway had to be erected for the protection of hundreds of sidewalk superintendents who usually throng the scene. For this part of the work, rubber-tired concrete buggies are being used. In any case, the concrete is chuted down into the pours, vibrated thoroughly, and finished off as necessary. The concrete work for the 56 column footings is, of course, all poured direct from the truck-mixers.

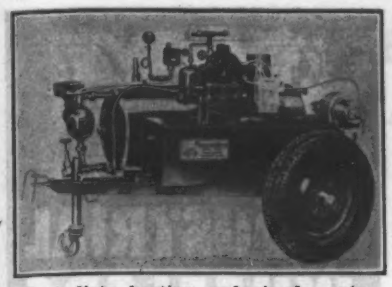
Load tests made on the dense clay subsoil showed negligible deflection on a square pad containing 2 square feet, under a total load of 10 tons for 36 hours.

Later on, other men will come along to erect the 750 tons of structural steel, lay 1,500,000 bricks, and install the granite and Bedford stone, fluorescent lights, and the other materials for this fine building. The foundation was the tough part. Working rapidly, praying for good weather and getting it, the crews are making excellent progress on this vital part of the work.

Personnel

Contract operations are under the general supervision of M. P. Myers, General Superintendent for Bank Building & Equipment Corp. of St. Louis. Field work is being directed by Charles Surbaugh, veteran builder of several big buildings in the midwest, with Richard Myers as Carpenter Foreman. Fred R. Bader is the Architectural Supervisor from the St. Louis office.

Bank Building & Equipment Corp. Photo
Here is what the new Amarillo bank building will look like when completed.



Immediate heating and simple, automatic operation are two features claimed for the Siebring Electro-Matic steam boiler.

Steam Generator Has Several Applications

A portable steam boiler in three sizes is announced by the Siebring Mfg. Co., Dept. CE, George, Iowa. Immediate heating and simple, automatic operation are two features claimed for the Electro-Matic trailer-mounted units. They are supplied in electric-driven or oil or gas-burning models, in 40, 60, and 90-gallon sizes.

Siebring recommends the units for driving steam-cleaning equipment, for heating sand and gravel, for heating tank cars, or as 4-hp steam boilers for supplying steam or hot water wherever needed. An attached unit heater is designed to keep a large-size workshop heated while supplying steam for other units. The company points out that a pressurestat holds the pressure constant once the unit is started; and that the power oil burner consumes any type of fuel oil. The unit is mounted on pneumatic tires and has a caster wheel to support the trailer hitch.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 39.

Cabinet With Drawers Stores Small Parts

Steel drawer cabinets for storing small items such as nuts, bolts, and electrical connections are manufactured by Equipto, Division of Aurora Equipto Co., Aurora, Ill. The drawers have adjustable cross dividers on 1-inch centers and lengthwise dividers which can be added or removed at will. The manufacturer points out that these cabinets can be used singly, side-by-side, back-to-back, or stacked vertically.

The Equipto cabinets are made in several styles to fit a wide range of purposes. The No. 11 has 18 drawers, each equipped with 3 cross dividers to provide 72 adjustable compartments. It is 34 x 13¾ x 12 inches in size. The drawer size is 11⅞ x 5⅜ x 3⅛ inches. The No. 8 has 8 drawers equipped with 2 cross dividers, giving 24 adjustable compartments. Its overall size is 25½ x 10 x 12 inches. The drawer size is the same as the No. 11.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 120.

Collimator Dept. Set Up

A complete collimator service is now available from W. & L. E. Gurley at Troy, N. Y. Gurley established the collimator department for testing divided circles of assembled theodolites and surveying instruments.

Six collimators, with telescopic lenses focused on infinity, have been placed at strategic intervals around a center post on which the instrument is mounted. Focusing on any collimator provides the equivalent of sighting a star, Gurley reports, although the distance from center post to collimator is only 10 feet. Azimuths are determined by revolving the instruments and sighting through each of the six collimators. First-order outdoor observing programs are thus duplicated without weather uncertainties.

Instruments reading to one second can be accurately calibrated to a fraction of a second, the company explains; 20-second surveying instruments are calibrated to approximately one second. All transits, levels, alidades, and theodolites are thus aligned by precise optical methods. The collimator correction, says Gurley, provides an exact measure of performance of the assembled transit, as well as an accurate method of adjustment to eliminate effects of manufacturing tolerances.

Heavy-Duty Engines In 4-Cylinder Styles

A new series of 4-cylinder gasoline engines is announced by the Hercules Motors Corp., Canton, Ohio. It includes the Model JX4E with a 3½-inch bore, 4½-inch stroke, and 164-cubic-inch displacement; the Model JX4C with 3¾-inch bore, 4¼-inch stroke, and 188-cubic-inch displacement; and the Model JX4D with 4-inch bore, 4¼-inch stroke, and 214-cubic-inch displacement. The JX4 series is parallel in design to the JX series of 6-cylinder engines.

Units in the JX4 series are equipped with five main bearings and a counterbalanced crankshaft. Positive oil seals at the front and rear of the crankshaft are designed to prevent the escape of oil at these points. Other features claimed by Hercules include precision-type main and connecting-rod bearings, high-turbulence-design combustion chambers, heavy-duty pistons with four rings, exhaust valves with austenitic heads welded to hardened nickel-steel stems, intake valves of chrome-nickel steel forged in one piece, oversized oil pumps of the gear type, and full-length water jackets for efficient and ample cooling.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 72.

The new John Deere Model R diesel-powered wheel tractor provides five forward speeds and one in reverse.

Heavy-Duty Tractor Has Diesel Engine

Production of a diesel-powered wheeled tractor is announced by the John Deere Tractor Works, Moline, Ill. The Model R features the hydraulic Powr-Trol, independent control of the power shaft, a deep-cushion seat, a large step-up platform, unobstructed view, foot-operated differential brakes, balanced weight, and efficient steering mechanism.

The transmission of the Model R provides five forward speeds ranging from 2⅛ to 11½ mph, and one in reverse of 2½ mph. The diesel engine is of the two-cylinder horizontal cast-in-block valve-in-head type. It has a 5¾-inch bore, 8-inch stroke, and a compression ratio of approximately 16 to 1. It has an 85½-inch wheelbase, 7:50 x 18 front tires, 14-34 or 15-34 rear tires, and a 62½-inch rear-wheel tread. The Model R has an overall width of 79½ inches, height of 78⅛ inches, and length of 147 inches. Shipping weight is 7,400 pounds.

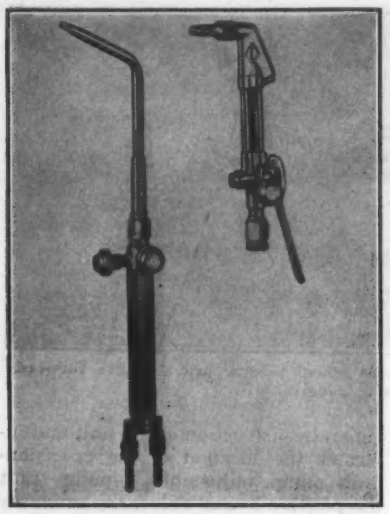
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 107.

Hydraulic Control Unit

A hydraulic power control system for use with snow plows or other truck or tractor-mounted equipment is described in a bulletin issued by the Monarch Road Machinery Co., Hydraulics Division, 327 Front Ave., N. W., Grand Rapids 4, Mich. The bulletin stresses the advantages said to accrue through the use of the Hy-Lo-Jack unit.

The bulletin shows a photograph of the unit in place and explains how the control lever is located independently in the truck cab. A drawing shows the general construction of the unit and indicates the location of the precision-built pump, adjustable V-pulley unit, the positive 3-way valve, the universal mounting bracket, and the lever running to the cab.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 79.



The AV-10 lightweight welding and brazing torch made by Liquid Carbonic Corp. converts to a cutting torch by use of a WC-10 cutting attachment.

Lightweight Torch

A lightweight welding and brazing torch is announced by The Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill. The AV-10 torch, says the company, has perfect balance and accurate control which permit precision welding of aluminum and other light-gage metals without burning.

Special valves and a Gasweld free-flow mixing chamber are designed to make possible positive flame control. The torch is equipped with a special type of packing which cannot be knocked out of adjustment accidentally when the torch is in use. The AV-10 can be converted into a cutting torch by use of a WC-10 cutting attachment, the manufacturer states.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 96.

Chain Safety Links

An improved connecting link is announced by the Interstate Drop Forge Co., Special Products Division, 4053 N. 27th St., Milwaukee 9, Wis. The Wedglok consists of three parts designed to be quickly assembled without special equipment. It is recommended by the manufacturer for use in connection with dragline buckets, slings, and other equipment requiring the attachment of chain or wire rope.

Wedgloks are available in both regular or pear shapes, and in sizes ranging from ⅜ inch to 3 inches. Their safe working loads are said to run from 8,000 pounds for the ⅜-inch size to as high as 185,000 pounds. The manufacturer states that the Wedgloks, during tests, have stood up under loads of as high as 295,000 pounds without showing signs of distortion or failure.

Further information may be secured from the company. Or use the enclosed Request Card. Circle No. 106.

Welding Handbook, Catalog

A combination handbook and catalog on a complete line of welding accessories has been made available by All-State Welding Alloys Co., Inc., 273 Ferris Ave., White Plains, N. Y. This illustrated booklet lists all the All-State rods and fluxes. It contains tables of characteristics of each item in the line, full application instructions, and helpful hints of a general nature on the use of rods and fluxes.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 38.

Compressor Built Up From 24 Basic Parts

Air compressors in a wide range of sizes and styles can be built up from basic parts designed by The Air-Flo Compressor Co., 357 W. Thornton St., Akron 7, Ohio. According to Air-Flo, these 24 principal parts can be combined into 102 different models, and from these 102 bare-pump models, 400 Air-Flo compressor outfit variations are possible. The outfits consist of bare pump, motor, tank, and accessories; the bare pump consists of crankcase and cylinder assembly with flywheel.

The different types of compressors include models in sizes from 1 to 40 hp with capacities of 2 to 275 cubic feet at 20 to 300-pound pressure; single-stage types for low pressure or large volume, or 2-stage for high pressure and cooler air delivery; vertical, V-type, or side-angle construction; single, twin, or radial-staggered cylinder arrangements; and models with long or short strokes for belt or direct drive.

Design features claimed for the Air-Flo line include an enclosed aluminum crankcase, finned aluminum cylinder heads, cast-steel crankshaft, Timken main bearings, drop-forged master rod, bronze master rod, aluminum pistons, Torrington needle bearings, full-floating wrist pins, easily removable valves, air-intake filter and silencer, oil-pump pressure lubrication, by-pass relief valve, and others.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 55.

Hydraulic Controls For Belt Conveyors

Hydraulic controls for the Tote-All lightweight belt conveyor are announced by the Lake Shore Engineering Co., Iron Mountain, Mich. The conveyor can now be equipped with a hydraulically controlled belt and be mounted on a hydraulically controlled Duo-Lift frame, Lake Shore states. The Tote-All line of equipment was formerly manufactured by Material Movements Industries, Inc., which was recently dissolved.

The new hydraulic system can be powered by either gasoline or electric units. Hydraulic control of the belt permits a reversing action and a range of speeds from 0 to 400 fpm. The Duo-Lift frame is mounted on four wheels equipped with 4:00 x 8 pneumatic tires. Height of the low end of the conveyor is adjustable from 20 to 48 inches. The high end is adjustable from 4 to 15 feet, depending on the conveyor's length. A tow bar permits towing by hand, truck, or tractor. Standard conveyors are available in lengths from 10 feet up, in multiples of 2 feet, and with belt widths of 8, 10, and 16 inches. Special lengths and widths can be manufactured to order.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 117.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York 16

Enclosed is my remittance of $3 for the next twelve issues of Contractors and Engineers Monthly.

Name .....

Position .....
(Or Type of Business)

Address .....

City .....

N.B., Cash, check or postage stamps will be entirely acceptable.

Hot-Mix Resurfacing On State-Wide Scale

Massachusetts Improves 77 Miles of Highways in 1948 With Machine-Laid Two-Course Black Top

✦ LAST year the Commonwealth of Massachusetts resurfaced 76.86 miles of highway, covering the seven districts into which the Department of Public Works is divided, at a cost of around $2,000,000. On all the 60 projects completed in 1948, the Type I bituminous concrete used in the resurfacing was purchased from privately owned asphalt plants, and the asphalt suppliers either laid the mix with their own forces or engaged contractors to do the paving. Machines laid the two courses of mix. Personnel included equipment operators from the ranks of the asphalt-supplying companies or the contractors, while the common labor was supplied by state force account. Force-account labor was also employed in preparing the highway for the resurfacing, and for subsequent clean-up operations such as shoulder work.

The bituminous concrete was purchased from the asphalt company submitting the lowest bid on the material required for each project. The Department of Public Works operates no plants of its own. It does, however, send laboratory inspectors out in the field to test the materials intended for use in the work. These inspectors set up job formulae for the mix, designed to cover the available materials and also to keep within the state specifications. The mix is continually tested at the plants, and after it is laid, field samples are taken to make sure that the proper compaction has been obtained.

An illustration of the wide-spread nature of the work is obtained from the fact that of the 38 commercial asphalt plants approved by the Department of Public Works as meeting the requirements of the standard specifications, 25 plants in all parts of the state supplied bituminous concrete for the projects. The various jobs ranged in size from a short section only 0.17 mile in length, which was completed in two days at an estimated cost of $3,713, to a 5.43-mile stretch that cost approximately $125,723. The latter was the longest, and also the only project that ran into six figures in cost.

Type I-1 Bituminous Concrete

Contracts for the plant-mix included delivering the material to the job and laying it as a pavement. Hauling costs were an important factor in the bid price, but as the available plants were well scattered geographically, the only long hauls encountered were on projects in the Berkshire Mountains in the western part of the state. The asphalt cement used in the mix was known as Department Specifications OA-3, with an 85 to 100 penetration. Coarse aggregate was crushed stone only, as no gravel was permitted, with everything passing the 1-inch sieve. The general composition of the mixture for the bottom and top courses, with the gradation of the coarse aggregate, fine aggregate, and mineral filler, is given in the following table:

Sieve Size		Per Cent by Weight			
		Bottom Course		Top Course	
Passing	Retained	Min.	Max.	Min.	Max.
1-inch	....	100	....	....	....
1-inch	¾-inch	0	10	....	....
¾-inch	½-inch	35	65	....	....
½-inch	....	....	....	100	....
½-inch	No. 4	10	30	20	60
No. 4	No. 10	5	15	10	35
No. 10	....	15	30	30	45
No. 10	No. 20	2	10	4	15
No. 20	No. 40	2	8	4	16
No. 40	No. 80	2	10	6	20
No. 80	No. 200	1	6	5	16
No. 200	....	1	6	4	9
Asphalt cement	85-100	4	6	5	8

The minimum thickness of resurfacing on a project was 2¼ inches, with the bottom course 1¼ inches and the top course 1 inch thick. The projects selected were those considered to be in the greatest need for improvement. No additional right-of-way was taken for purposes of widening. In all cases the existing road was simply covered over with the new surface. In some cases where the pavement was only 18 feet wide and flanked by 3-foot gravel shoulders, the width of the resurfacing was extended to 24 feet, taking in the shoulders. New shoulders were constructed later. If any heavy grading was required, the entire project was let as a separate contract.

The Massachusetts Department of Public Works is headed by William F. Callahan, Commissioner, with Philip H. Kitfield, Chief Engineer. James E. Lawrence is Maintenance Engineer.

Fraser, Brace Appointment

William E. O'Brien, until recently Project Engineer for Associated Universities, Inc., on the Atomic Energy installation at Brookhaven, Long Island, has joined the staff of Fraser, Brace & Co., Engineers and Constructors, 10 E. 40th St., New York, N. Y. He will be associated with Harry Englander, General Manager.

This ladder bracket has several uses: by gripping a building roof, it holds the ladder away from the structure, protects it, and permits work under projections. Used in pairs, the brackets make an easily assembled scaffold.

Bracket for Ladder Protects Roof Edges

An offset bracket designed to hold ladders away from the wall of the structure and still provide a steady grip on the ladder has been developed by the Steadfast Equipment Co., 57 Wheeler Ave., Pleasantville, N. Y. It is said to increase the usefulness of ladders and to reduce the hazards of working with them.

The ladders secure their bearing by means of a swivel bearing plate. The offset feature protects cornices and other projections, and also permits work under the projecting areas. Another feature claimed by Steadfast is that the brackets can be used in pairs to form an easily assembled scaffold. The scaffold arm is held level, without adjustment, when the ladder is set at the proper pitch, and may be used on either the inside or outside slope of the ladder rails. The brackets can be used with any standard-type ladder.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 59.

New 11-Inch Lathes

A new line of 11-inch lathes has been brought out by the Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill. The lathes are available in cabinet, bench, and floor models. They have a 1-inch collet capacity for draw-in collets, the manufacturer states, and center distances of 24 and 36 inches.

The Logan pre-loaded ball-bearing spindle mounting is said to assure accuracy at spindle speeds from 45 to 1,500 rpm, without bearing adjustment. The total spindle run-out is held within 0.0005 inch, 12 inches from the bearing. The two V-ways and two flat-ways are precision-ground to a tolerance of 0.0005 inch along the linear capacity of the lathe. The units have self-lubricating bronze bearings, and their quick-change gear equipment is designed to provide an instant selection of 48 different threads and feeds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 78.

Equipment on Half-Tracks

Half-track trucks converted to construction use are described in an 8-page catalog prepared by the Wilensky Auto Parts Co., 1226 Washington Ave., N., Minneapolis 1, Minn. Pictures show the vehicles towing rollers, disks, and dirt scoops, as well as mounting cranes, drills, A-frames, and dump bodies.

General data on White half-track vehicles are included in the catalog. They cover dimensions, performance features, and specifications of the 148-hp gasoline-engine power unit. The performance features listed cover maximum grade the units will climb, turning radius, fording depth, maximum vertical obstacle the half-tracks will climb, and maximum allowable speeds. The catalog also describes briefly the Wilensky services and supply of parts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 36.

Device for Drawing Perspective Views

A draftsman's instrument designed to simplify perspective drawing has been developed by the Charles Bruning Co., 4754 Montrose Ave., Chicago 41, Ill. The Perspect-O-Metric, says the company, automatically guides the draftsman's pencil towards established vanishing points from any position on the drawing board. The device can be used with any standard drafting machine or attached to a parallel-ruling straightedge.

The Perspect-O-Metric has three scale arms. The central arm is fixed in a position at right angles to the established base line. The left and right scale arms pivot at one end and swing in the plane of the drawing board. The instrument provides for two vanishing points, which can be located at any position along the edges of the drawing board. A small pulley is clamped over each of the chosen vanishing points. The swinging right and left scale arms are held in strict alignment with these vanishing points by a piano-wire spring which is attached to the end of the scales and then runs around the two pulleys.

Any movement of the Perspect-O-Metric creates a corresponding angular motion of the swinging scale arms. And, the manufacturer claims, no matter where the unit is placed on the drawing board, the scale arms remain oriented to the chosen vanishing points. Special scale arms with graduations of diminishing distances are designed to keep the drawings in proportion, despite apparent reduction in size with distance. To prevent the scales from shifting under the pressure of the draftsman's pencil, a left and a right brake lever are provided. Pressure of the thumb locks the scale arm in position temporarily; or it can be locked in place by tightening a knurled nut. With the arms locked, the Perspect-O-Metric can be used for isometric drawings.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 6.

Leak-Stopping Compound

A material for stopping leaks and water seepage due to actual breaks or hair-cracks in masonry and concrete structures is described in a folder issued by the Stonhard Co., Dept. C&EM, 1306 Spring Garden St., Philadelphia 23, Pa. The folder explains that Stonhard Stontite effectively stops all types of leaks in above or below-ground interior or exterior structures, and against hydrostatic pressure.

The folder pictures several possible applications of Stontite, and tells how to mix it, how to prepare the area to be mended, and how to finish the repaired surface. The catalog also contains information on the Stonhard trial offer, and on other products made by the company.

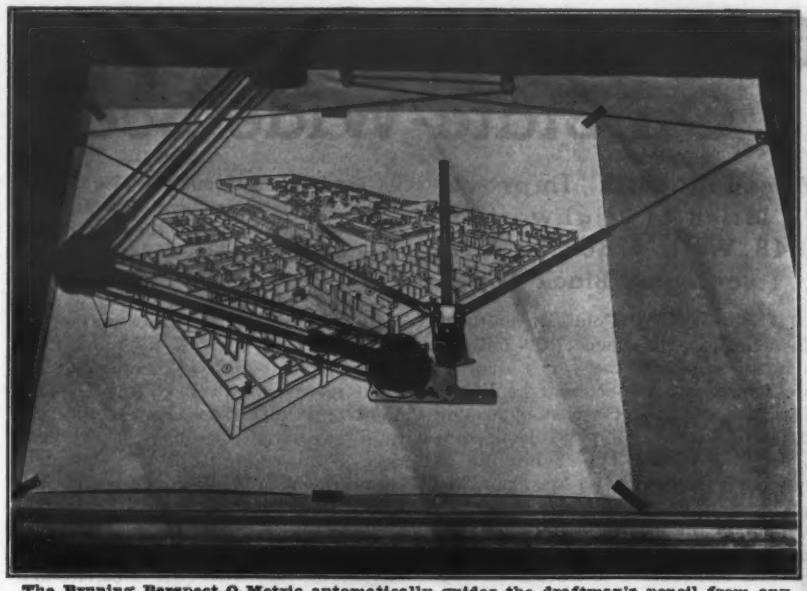
This literature may be obtained form the company, or by using the Request Card at page 16. Circle No. 105.

Plastic Safety Eye Shield

The advantages of safety eye shields are graphically presented in a catalog prepared by the United States Safety Service Co., 1215 McGee St., Kansas City 6, Mo. This folder features the case history of an actual instance in which a Saf-I-Shield is credited with saving a man's eyes.

The catalog also describes the Saf-I-Shields and lists the advantages claimed for them by the manufacturer. It points out that Optilite, the specially developed optical plastic they are made of, gives greater strength, better optical qualities, and lightness and comfort. The Saf-I-Shields are available with two types of ventilation and three styles of lens: all crystal-clear plastic, clear lenses with green side shield, and all-green anti-glare.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 62.



The Bruning Perspect-O-Metric automatically guides the draftman's pencil from any position on the drawing board towards the established vanishing points.

Vermont Dept. Reorganized

Vermont district highway commissioners and department staff members met recently to be introduced formally to Vermont's new Highway Commissioner, F. Richard Bradley of Brattleboro, and to the recently appointed Board Member, Porter J. Moore.

The greatly increased amount of business being done by the State Highway Department dictated a return to the two separate positions of Commissioner of Highways and Chief Engineer, which had been combined under Hubert E. Sargent since 1929. Mr. Sargent will continue as Chief Engineer.

Those attending the meeting were briefed on changes in the organization of the State Highway Department. They also discussed problems concerning the maintenance of state machinery and equipment, and the need for engineering assistants for the commissioners.

Right-of-Way Buying On Parkway Project

Real-Estate Division Does Huge Business as Extensive Properties Are Bought for Highways

✦ IF there is such a thing as a "hot spot" anywhere in public life, it is best exemplified in the right-of-way division of a state highway department.

Frank C. Balfour, Chief Right-of-Way Agent for the California Division of Highways, heads up one of the nation's biggest real-estate businesses. This year Balfour's department will buy $37,000,000 worth of real estate in the form of land and buildings. Subject to as many complications as there are transactions involved, this big business is handled swiftly and efficiently. Less than 2 percent of all transactions go to court in condemnation proceedings.

"It needn't be a hot spot if the right-of-way people get on the ball, stay there, and walk a straight line", is Balfour's contention.

One of the biggest single subdivisions under jurisdiction of state headquarters in Sacramento is the Right-of-Way Department of District VII, in Los Angeles. In order to make way for the fast parkways of the Metropolitan Los Angeles Parkway System, more than 100 parcels of property are currently purchased each month by the Right-of-Way Department. Total cost of property porgrammed for acquisition this year in District VII will be approximately $17,000,000. The importance of right-of-way negotiations and purchases in the California Division of Highways thus ranks equally with construction, engineering, and design.

Divisions Work Together

Right-of-way policies in District VII are an accurate reflection of the statewide policies established by Balfour's office and approved by George T. McCoy, State Highway Engineer. They follow a pattern which is now well established.

Take the case of the Los Angeles parkways. When the need for additional fast expressways became apparent, location engineers surveyed several proposed routes. With these several proposed routes charted, the Right-of-Way Department was then called in.

Real-estate experts from this Department, experienced in appraising property values, made estimates of the amount of money it would take to buy the right-of-way for each route. Armed with this information, right-of-way experts, engineers, and designers, and representatives of the city and county who cooperated in the plan, then held a conference, or a series of conferences.

The guiding factors in the selection of the final routes consisted of three basic questions: (1) How much will the construction cost on this right-of-way? (2) How many people will be inconvenienced if we build it here? (3) How many people will the new parkway serve on this location? Considerations of design, of grading costs, and so on, were all subordinated to these major questions. This was the set of values which determined the final locations.

The parkway system was designed, in other words, to serve the most people with the least inconvenience to individuals. And how it was accomplished is a story of difficult human relations made simple.

The Right-of-Way Organization

At least part of the right-of-way efficiency is due to the organization itself under Frank C. Balfour, Chief Right-of-Way Agent. Directly under Balfour are four Assistant Chief Right-of-Way Agents. One of these men is in charge of all appraisals, one supervises general administration, one has headquarters in San Francisco and takes care of northern California, while one in Los Angeles takes care of the southern half of the state.

The Assistant Chief in Los Angeles is E. F. Wagner. H. W. Leonard, Metropolitan District Right-of-Way Agent, directly supervises right-of-way acquisition in the District VII office in Los Angeles.

The District VII Right-of-Way Department has approximately 150 employees, including the right-of-way engineering and clerical staff. It has an appraisal section employing 18 men whose time is devoted exclusively to appraising all types of properties ranging from cheap desert land to expensive commercial and industrial properties.

The other organizational branches include a negotiating section with 18 men, an administration section with 4 men, a house-sales section with 4 men, a public utilities and building-relocation section with 4 men, and a rental section with 12 men. "Men" is used purely in the abstract, for women are also employed.

The masculine force is predominant, however, and is built around a group of four major civil-service classifications. At the bottom of the ladder is the Junior Real-Property Agent. This classification was created shortly after the war for the primary purpose of recruiting young live-wire fellows into the Right-of-Way Department on a trainee basis. Some years ago, Mr. McCoy and Mr. Balfour realized that in order to put over California's huge post-war right-of-way acquisition program, it would be necessary to recruit and train their own men in this specialized field of right-of-way work. Accordingly, this classification was established as the beginning position in the right-of-way profession.

To qualify generally for this job, a man must be young and be a college graduate, preferably with a degree in engineering, economics, business administration, or law. Engineering graduates have proved very satisfactory. In any case, the man must indicate in his first interview an aptitude and willingness to make a success in this type of work. If he passes the civil-service examination and is hired, he gets a starting salary of $268 per month. This is only the beginning, as the Department, through its extensive in-training program, requires that its junior agents "come up" under the more important job assignments in store for them.

After 12 months, the man *must take and pass* the civil-service examination for the next position higher, which is that of Assistant Right-of-Way Agent. The Department holds that if the man does not properly qualify for this promotion, he is not suitable material for the Right-of-Way Department, and steps are taken to let him go. The Department does not want men who, for lack of initiative, ability, or willingness to get ahead, will not grow with the organization.

After 24 months, an Assistant is eligible to take the examination for Associate Right-of-Way Agent, which pays from $395 to $481 per month in step increases. In this position a man is considered a well-seasoned, experienced, all-around top appraiser and negotiator.

The field of advancement begins to narrow considerably with the next step, which is that of Senior Right-of-Way Agent, paying $458 to $556 per month. This is for supervising positions, such as a District Right-of-Way Agent in charge of a small district right-of-way department, or the four assistants to the Metropolitan District Right-of-Way Agent in District VII in Los Angeles.

Above the Senior position are those of the Metropolitan District Right-of-Way Agent, Assistant Chief Right-of-Way Agent, and Chief Right-of-Way Agent.

In summary, the Right-of-Way Department is so organized, on a statewide basis, that it provides a promotional pattern within which the beginning Junior Agent can work up the ladder through the full scale of positions to that of Chief Right-of-Way Agent for the entire state.

On the theory that individuals cannot all be molded into an arbitrary pattern, new men work in first one department and then another to determine their likes, their dislikes, and their particular aptitudes. A man, for example, who does not like to talk and interview people might not be a very good negotiator, but he might make an excellent appraiser. Thus as each man progresses with the organization he contributes his optimum to its welfare and growth.

Too, the men are never entirely idle even aside from regular working hours. Most of the younger men especially are constantly taking prescribed study courses, patterned somewhat after International Correspondence School courses. Questions are made up by department heads and the examinations or assignments are given to the employees. If an answer is wrong, the paper goes back to the man and he must study until he can give it correctly. These study courses are not compulsory, but promotions come faster for the men who take them, as a rule.

How Property Is Appraised

Property is purchased in an orderly, almost assembly-line manner. When the permanent right-of-way lines have been established and surveyed, the right-of-way appraisers, fortified with detailed highway plans, are ready to start work. By that time, of course, property owners within the affected area have already seen the state highway survey crews. Some are alarmed, some are resigned to their fate, and some are plain mad.

The first right-of-way representatives to enter the scene are the appraisers. They go out, measure up the property, introduce themselves, and generally make a full initial survey of the value of the parcel of property under consideration. They even talk to real-estate dealers in the neighborhood, and study similar real-estate transactions involving other properties sold in the locality with similar characteristics.

One thing the appraiser does not do on this call. He does not mention the appraised price, nor does he say out loud what he thinks the property is

(Continued on next page)

Right-of-Way Buying On Parkway Project

(*Continued from preceding page*)

worth. His job is to be as impartial as he can possibly be, to set a figure representing every penny the property is worth at current market value, but no more.

It is extremely important that these appraisals be accurate and complete in every detail. The appraiser must weigh and evaluate all factors which influence the market value. Notable among these factors are size, shape, appearance, street improvements, soil conditions, climate, public utilities, general tone and appearance of the neighborhood, facilities for community life, condition of title, deed restrictions, zoning, ordinances, easements, income, taxes and expenses, selling and asking price of comparable properties, past performance, trends of growth, demand for and supply of similar properties, and position of the real-estate market in the general economic cycle.

In those cases where only a portion of a property is acquired for highway purposes, it is also necessary for the appraiser to determine the damages, if any, to the remaining portion not taken. These damages generally involve severance or consequential damages, such as that occasioned by leaving the remaining property in such size or shape that it cannot be devoted to its highest and best use, or damages which the property suffers by reason of the construction of the highway improvement in the manner proposed. A typical case would be a change-of-grade damage.

The right-of-way appraiser in California must also have a knowledge of condemnation law in order to differentiate between those types of damages that are legally compensable and those that are not. For instance, under California law, the following types of damage are not compensable, even though the owner may suffer a real and material damage:

1. Damage to business.
2. Expense of moving personal property, or damage arising from owner's inability to locate an acceptable substitute location.
3. Loss of profits due to necessity of moving business to some other location; loss of profits due to interruption of business by reason of and during the course of construction of the public improvement, or for any reason at all.
4. Noise and fumes caused by increase of traffic.
5. Damage due to annoyance or inconvenience suffered by public generally.
6. Security of travel caused by divided highway.
7. Rerouting or diversion of traffic.
8. Increase or decrease of amount of traffic on the highway.
9. In general, all types of damages which can be considered potential; speculative and remote damages, being uncertain and difficult of ascertainment, are not to be considered.

Role of Negotiator

After the appraisal is completed, next comes a negotiator. A good negotiator is usually able to buy a piece of property in two calls, unless the property is exceptionally large or complicated. It is always easier to buy a whole piece of property than a part of a piece, because so many intangibles are involved in the latter case, such as possible severance or consequential damages.

The negotiator talks to the property owner, explains that the new parkway is vitally necessary to the general public, and that while the State regrets very much the personal inconvenience to him, it must buy his property. Ordinarily one would think that at this point the shooting would start. Such is not the case. So good a reputation has the California Division of Highways established for fair dealing that about 98 per cent of the people are willing in varying degrees to sell.

In fact, negotiators are carefully coached by the older men in the organization never to lose their tempers, and to treat all property owners fairly and impartially. It used to be that the tougher and meaner a property owner acted, the more money he usually wound up with, especially if the case went to court. Not now. A tough nut can browbeat and argue and scream all he wants. The negotiators do not mind. They will give the man exactly the same kind of deal they give a citizen willing to sell without a fuss: a square deal.

The negotiators all run into some interesting problems of human behavior, but all report a somewhat similar pattern. For instance, an agent who furnished many of the notes for this article states that one of the easiest individuals to do business with is a hard-headed businessman. He either knows what his property is worth, or he will get an independent appraisal immediately upon learning that his property will be affected by the highway improvement.

Russian and Portuguese descendants are something else. These people are the most hospitable of all, but they simply do not want to sell and move away from where they have lived so many years. They will invite the negotiator to stay for dinner, to have a drink, and they will show him every courtesy—not because he is a negotiator, especially, but because they are just that way. But arriving at a buying figure is tough with them.

The toughest customer of all is the man who just sits, while the negotiator is trying to do business, and says nothing. It's disconcerting. The negotiator covers all the explanatory ground he believes necessary. The fellow just sits there and says nothing. He tries again. Same result.

The agent had this to say: "Back in my younger days with the Department I negotiated about 250 purchases up near San Francisco. The only details I can remember of that whole job concern the buying of two such properties. I even remember the names of those people! Man, they were tough!"

The person who has possibly the most exalted opinion of all about the value of his property is the average middle-class white-collar American of English descent. When confronted with factual appraisal information, however, these people are usually amenable.

About 2 per cent of the property owners simply will not sell. In these cases, the State brings condemnation proceedings in the courts. Should a property owner whose land is being condemned be in Europe, say, where he cannot be contacted, the State may, according to law, go ahead with condemnation proceedings anyway, if it deposits with the court a sum equal to the fair market value of the land. It seems harsh, but actually the results are about the same in the end.

Whenever the State must go to trial in condemnation proceedings, it employs the best possible outside independent real-estate appraisers to act as expert witnesses in its behalf. These men make their own independent analyses of the property, and then defend their figures on the witness stand in court.

There may have been cases where legal proceedings have held construction up, but not too many.

Rental Units Managed

Because the number of real-estate properties is so great and so involved in a piece of construction as gigantic as the Los Angeles Parkway program, the Right-of-Way Department must work from necessity for months and sometimes a year or two in advance of the construction contracts. What this means in the final analysis is that the State, as owner of the property, finds itself with tenants on its hands.

If the housing shortage in Los Angeles were not so acute, the problem would not be so serious. As it is, practically all low-cost housing in the city is filled up, and there are vacancies only in higher-priced housing.

Feeling morally bound to keep these properties intact as long as possible commensurate with construction, the State continues to rent the various homes and apartments located within its right-of-way, collecting rent and turning it back to the state highway fund. The houses are then sold, with the stipulation that the buyers move them by a certain date and assume responsibility for the tenants for six months after the date of purchase. This gives the State a guarantee that the property will be moved, and it gives the people affected a chance to hunt new housing.

Since VJ Day the District VII right-of-Way Department has removed in excess of 1,500 buildings from within

(*Concluded on next page*)

its parkway right-of-ways, involving approximately 2,000 families or 6,500 persons. In spite of the fact that this number of buildings and affected individuals is comparable in size to that of a fair-sized town, the job of right-of-way clearance was expeditiously accomplished without the necessity of going into court with a single eviction proceeding.

Housing Is Main Criticism

Some of the main criticisms of the Right-of-Way Department come, quite frankly, in connection with residential properties on highway right-of-way from the time they are bought until they are sold.

The criticisms are varied. Some people cannot understand, for example, why some of the houses are vacated weeks or possibly months in advance of construction work. The answer is that there are only so many house-movers in Los Angeles, and the State cannot possibly afford to work so close to the moving deadline that construction contractors would be delayed.

Another criticism is the one that the State is destroying much needed housing. This simply is not true. Out of every 100 residential properties, about 10 buildings are generally demolished, depriving people of housing. These are generally run-down ramshackle slum-type homes, so old and rotted that they would have very likely fallen down anyway in a year or two if left alone.

All the other homes are moved off the right-of-way to vacant lots which the buyers have purchased in another part of the city somewhere. There they are set up, perhaps rebuilt or even made larger. And they continue to take care of the *housing of a city's people*—which is the only broad way to consider it—for a long time to come.

Still another argument is the one that the State, by selling the property and building a highway, loses the taxes on the property. It does lose taxes from the land, of course, but all the houses which are moved continue to be taxable regardless of their new location. And since most of the houses are moved to localities like those from which they came, the taxes are generally the same. Also, it must be recognized that any loss in taxes is offset many times over by the benefits accruing to the general neighborhood through which the parkway passes. These benefits reflect themselves in increased property values and tax returns.

When the Right-of-Way Division says its policy is to serve as many as possible, with as little inconvenience to individuals as can be arranged, it means it.

Broadly speaking, that is how the Right-of-Way Division operates and functions in the California Division of Highways, with special emphasis on District VII. Details, so numerous that one could write a book about them, are handled in the best and most sensible manner to fit the locality and the case.

S. V. Cortelyou, co-author of our article on the Los Angeles Metropolitan Parkway System, (see C. & E. M., May, 1949, pg. 6) is in general charge of District VII as Assistant State Highway Engineer, Metropolitan District.

AUTHOR'S NOTE: The foregoing article is intended to treat in a general sense the aims, the organization, and the policies of the Right-of-Way Division of the California Division of Highways.

It must be realized that from time to time special cases may arise which merit special attention, outside the organizational framework of this article. Thus, while these cases are few, nothing in this article is intended to portray the general facts mentioned as being necessarily ironclad matters of policy or precedent. It should be noted strictly that this article is the work of an independent author, and that it does not necessarily reflect all matters of policy which, from time to time, may come before the California Division of Highways.—Raymond P. Day.

Roof and Deck Cloth; And Tarpaulin Covers

Tarpaulins and roof and deck cloths are manufactured by C. R. Daniels, Inc., Daniels, Md. The Dandux Stop-Loss tarpaulins are available in 81 combinations of sizes, weights, and construction. Features claimed for them are a ¼-inch rope framework around the sides with 5/16-inch diagonal ropes to relieve stress and strain; a contrasting center strip of green canvas with the owner's imprint; patented rip-proof sewing in the rope framework and seams; and patented metal corner plates of 26-gage steel. The brass grommets on all corners are built to withstand a 1,500-pound pull.

Among the features claimed for the Dandux roofing and deck cloth are a high tensile strength due to close weaving of the fabric; tested wearing qualities; thorough impregnation under high pressures to provide waterproofing and long life; and a complete range of weights and sizes. Dandux requires no pre-coating, the company explains, and does not have to be laid in wet paint. It is yellow in color and is available in light, medium, heavy, and extra-heavy weights. Widths available are 22, 30, and 36 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 136.

Rod for Tack Welds

A new electrode is announced by the Hobart Bros. Co., Hobart Square, Troy, Ohio. It is designed for making high-speed tack welds on heavy weldments without the necessity of breaking the excess coating from the end of the electrode each time the arc is started or restarted. Hobart No. 384 is described as a Class E-6020 electrode and is said to have a concentrated and forceful arc which makes it good for cutting scrap with an electric arc.

According to Hobart, touching the end of the electrode to the work piece is sufficient to restart and maintain the arc. The coating is said to have sufficient dielectric strength to withstand scraping against the work piece or ground without arcing through. Electrode No. 384 is available in 14-inch length in ⅛, 5/32, 3/16-inch sizes and in 18-inch length in ¼-inch size. It is packed in standard containers of 50 pounds each.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 139.

Data on Power Hack Saws

Power hack saws are the subject of a 4-page catalog prepared by the Miller-Knuth Mfg. Co., 2814 N. 20th St., Omaha 10, Nebr. Listed in the folder are the utility bench saw Model No. 3101 with a 4 x 4-inch capacity; the caster-mounted Model 3112-B with a 4 x 4-inch capacity; and the caster-mounted Model No. 3114 with a 6 x 6-inch capacity. Variations on these basic models are also described in the folder.

Among the features claimed for the Sawmaster units are blade speeds of 90 to 100 strokes per minute, vises which can be set for cuts at any angles, ample use of bearings, a special type of cam mechanism, and an automatic switch which shuts the machine off when the cut is completed. The catalog also contains data on the Sawmaster line of blades for power hack saws and on the stock dolly for handling long members.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 108.

This is the new Northwest truck crane and carrier combination. The Crane has a capacity of 20 tons, and the boom can be extended from a minimum of 30 feet to 100 feet.

Truck Crane, Carrier Has 20-Ton Capacity

A truck crane and carrier combination with a capacity of 20 tons is announced by the Northwest Engineering Co., 135 S. LaSalle St., Chicago, Ill. It has a minimum boom length, for crane work, of 30 feet; this can be extended, the manufacturer reports, to 100 feet. The method of attaching the crane lower base to the carrier is said to permit the transmission of loads evenly over the top and sides of the carrier.

The main operating machinery of the crane is mounted on cast-steel side frames. All high-speed shafts are mounted on ball or roller bearings. Standard equipment includes Feather-Touch clutch control, said to utilize the power of the engine to throw heavy drum clutches; uniform-pressure swing clutches; and a high-speed power-controlled boom hoist independent of all other operations.

The carrier has a box-type truck frame reinforced the full length of the carrier. Outriggers extend the full width of the carrier and have unusual bearing support when extended, Northwest says. The forward outrigger is positioned close to the rear wheels to relieve the carrier of a greater amount of stress. The rear outrigger truck is demountable and makes it possible to change from crane work, to shovel, dragline, or pullshovel work without repositioning the lower base for the crane, Northwest reports.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 142.

New Plastic Coating Protects Wood, Metal

A new coating which gives surface protection to wood, metal, tile, masonite, and composition materials, was introduced recently at a Manhattan press luncheon by L. Sonneborn Sons, Inc., Building Products Division, 80 Eighth Ave., New York 11, N. Y. Phenoplast, as its name suggests, is a phenolic-plastic finish made without baking or pressure molding. Applied by brushing, spraying, or dipping, it is dry to the touch in about 3 or 4 hours and reaches maximum hardness after 5 to 7 days. Used like glue on wood or metal, it becomes an almost inseparable "joiner", says Sonneborn, and will resist wind, weather, temperature changes, and almost any amount of wear and tear.

Phenoplast is described as a 100 per cent phenolic resin combined with a catalyst hardener which supplies the chemical equivalent of heat for the curing process. Wood surfaces treated with it become almost completely waterproof, says Sonneborn, and will not warp or swell; it withstands abrasion, high and low temperatures, sun, fire, acids, and most chemical solvents. The coating itself is transparent, but it can be used with a colored primer called Underpheno, which comes in red, green, brown, gray, and black.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 81.

Can Wood Contribute To Soil Improvement?

This question was posed by A. C. McIntyre, Chief, Regional Forestry Division, U. S. Soil Conservation Service, Upper Darby, Pa., to the Committee on Roadside Development at the annual meeting of the Highway Research Board. He stated that in his opinion the answer is "yes", but there is need for more research before the full answer can be given to the corollary question "how?".

As a forester, Mr. McIntyre has been concerned with the multiple uses of wood. Its agronomic possibilities were suggested more or less by chance when a farmer told him that wood is "the cheapest organic matter I can get". This led Mr. McIntyre to further discussions with agriculturists, and he found many reports that the introduction of wood into soil had improved its quality and increased crop growth.

There is an old wives' tale, Mr. McIntyre said, that wood sours soil and makes it acid. This belief may account for the fact that wood has not been used more generally as a mulch, or plowed into the soil to increase or maintain its organic content. Several comprehensive studies which have been made on the value of wood as organic matter indicate that any unfavorable action of wood on plant growth was due to a lack of nitrate in the soil. There is no evidence that wood produces excessive soil acidity, and it does furnish the most desirable type of humus—a long-life humus resulting from a combination of lignin and bacterial proteins.

It is accepted, Mr. McIntyre said, that a beneficial physical effect accrues to soils by mixing sawdust with them. Adding sawdust to heavy soil has improved its structure, as reflected by ease of tillage and infiltration rates. Aeration is improved. Sawdust and shavings have a high water-absorbing capacity and contribute this quality to both heavy and sandy soils. While there is no reported research on the use of chips, either small fragments or wood chunks, it is reasonable to assume that the incorporation of wood in any form will improve the physical properties of soil.

Mr. McIntyre also pointed out that wood might make as great a contribution to the control of wind and water erosion as other sources of humus material, since it has been well established that there is a direct correlation between the erodibility of soil and its organic-matter content.

Is empirical research ahead of planned research, Mr. McIntyre asked? If wood is making a real contribution to the farming practices of a few, can it not also aid others concerned with plant and grass growth and control of soil erosion? Of course, economics and costs must be considered. However, in many sections of the country, sawdust is readily available; millions of tons of it are wasted. He mentioned also the availability of light portable wood chippers to convert chunk or pole wood or brush cuttings into chips easily and economically. These units are readily moved from job to job, and it has been reported that their use has reduced by as much as one-half the cost of disposing of cuttings. This suggests a two-fold economy: less expense in removing accumulated debris resulting from clearing and pruning operations; and low cost wood chips for mulch or soil improvement.

Mr. McIntyre's discussion raises two points of interest to roadside-development engineers. First is the use of wood for soil improvement, to help establish satisfactory turf or ground cover on shoulders and slopes. If wood can be used in lieu of more expensive organic material preparatory to seeding operations, it might cut seeding costs.

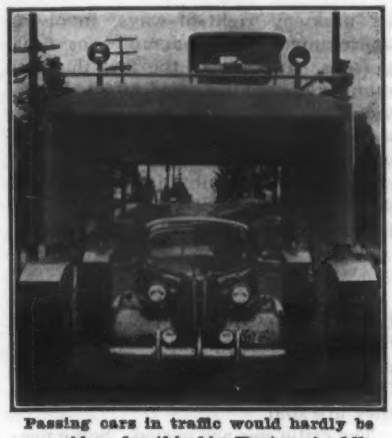
Its use as a mulch is another point. Many highway departments have the problem of the disposal of brush and shrub cuttings resulting from roadside operations. If these could be used as mulch on other roadside work, another possible economy is offered.

As Mr. McIntyre stated, these are still questions to be answered. However, they merit some thought, and some experimental work along those lines might be well worth while in the interest of more economical and successful erosion-control work.

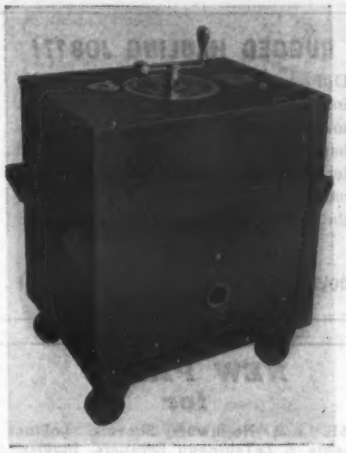
Students Are Given Facts On Highway Engineering

A realistic glimpse into the professional life of a highway engineer was recently presented to upperclassmen of ten Pennsylvania colleges and universities conducting courses in civil engineering. W. A. Warrick, Chief Construction Engineer of the State Department of Highways, spoke before gatherings at the schools and discussed opportunities in the field of highway engineering, the type and magnitude of the highway task, departmental organization, and other phases of highway work. Each of Mr. Warrick's lectures was followed by a question-and-answer period.

The students were also shown the State Highway Department's sound-and-color movie "Construction Ahead", which pictures all phases of highway work from the design stage through grading, building, and material tests, to final completion.



Passing cars in traffic would hardly be a problem for this big Hyster straddle truck designed for pipe laying. The machine was recently shipped to the Boh Brothers Co. of New Orleans, which will use it to straddle ditches and handle 40-foot sections of steel pipe weighing 11 tons each, 56 inches in diameter.



This Model 200 electric-arc welder, made by U.S. Electric Welder Corp., features stepless control and more than 300 heat selections.

Electric-Arc Welder

A 5 to 180-amp electric-arc welder is available from the U. S. Electric Welder Corp., 1258 Dorr St., Toledo 7, Ohio. The Model 200 has a stepless control, the company points out, and draws only 30 amps from the power line. It measures 21 x 14 x 22 inches; is supplied with a complete set of cables, electrode holder, approved shield, and an assortment of electrodes; and is mounted on casters to make it easy to move.

The Model 200 has an overall efficiency of 95 per cent as measured by kilowatt input, says the manufacturer, and requires no capacitor. It has four coils and a power surge of 8 per cent increase at any current setting. A special in-built construction causes the striking or arc-holding voltage to increase as the welding current is reduced, U. S. reports. The unit is designed to operate on single-phase current or on one leg of two or three-phase lines.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 2.

Protective Curtain

Welding curtains and salvage covers are now manufactured by A. Smith & Sons, 1239 Ridge Ave., Philadelphia 23, Pa. The welding curtains are designed to confine welding operations to a given area and to protect other workers and passers-by from sparks and the harmful and direct rays given off by the welding operations. They are constructed of standard U. S. Army duck weighing 10 ounces to the square yard, and are treated with Hooper Fire Chief.

Standard curtains are furnished with eyelets across the top spaced on 10-inch centers. Two eyelets are placed in each lower corner. The Smith curtains can be suspended on a horizontal rod or pipe support by means of hooks or cord lace. Bottom eyelets allow for rope attachment to pull the curtain taut, or to pull it out of the way when work is taken in or out. Smith reports that double-row stitching is used on all seams, and a substantial hem is provided on all four sides.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 110.

Skid-Control Tires

A new style of tire said to provide skid control on slippery surfaces is announced by the Penetred Corp., Marshfield, Wis. The tire, Penetred reports, has steel claws imbedded in the tread rubber during the treading process. These claws are designed to cut through ice and snow and to grip on slippery road film whenever power or brakes are applied. The Penetred tires are made in truck and passenger-car sizes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 90.

TRADING POST

CLASSIFIED ADVERTISING RATES

When less than 50 inches is used during one year the rate is $8.00 per inch. When 50 inches or more are used during one year the rate is $7.00 per inch. An advertising inch is measured ⅞-inch vertically on one column. Space reservations close in the New York office on the 18th of the month preceding publication. Send your classified copy to:

The Trading Post, Contractors & Engineers Monthly
470 Fourth Avenue, New York 16, N.Y.

FOR SALE
DIESEL ELECTRIC SHOVEL
¾ Yard Capacity Shovel
with
New General Motors Model 3045A Diesel
Excellent Operating Condition
May be inspected and operated by appointment
INDUSTRIAL SUPPLY CO.
501 North Cortez Street New Orleans, La.
Audubon 3761

TRADE-IN BUYS OF THE MONTH

Bucyrus-Erie Dozer Shovel on TD-9
Now $5150.00

International TD-18 with Le Tourneau Blade
Now $7500.00

Call Baldwin 9-1950

Service Supply Corporation
20th and Erie Ave.
Philadelphia 32, Pa.

SHOVEL FOR SALE
Model 44-B Bucyrus-Erie 2-yd. Shovel with Buda Diesel Engine. Equipped with 15'-2" tracks, 33" pads. (Now located in Ohio.)
WESTMONT TRACTOR & EQUIPMENT CO.
Missoula, Mont.

DECALS
SAVE 25% ON YOUR DECALS
10 DAY DELIVERY
MIRACLE DECAL CO.
WICHITA, KANSAS

The Trading Post
&
Contractors & Engineers Monthly
are always ready to help you sell your surplus new or used equipment.
Send a list of your equipment now to appear in our next issue to:
Classified Advertising Dept.
Contractors & Engineers Monthly
470 Fourth Ave.
New York 16, N. Y.

For Sale
Cummer Portable Asphalt Plant, Two Fire Dryer—complete. Good condition.
Hennessey-Forrestal Machinery Company
705 Chestnut St. St. Louis, Mo.

BOILERS and STOKERS FOR SALE
3 H.B. Smith Boilers # 60820, 15 # WSP., 13,250 EDR.
3 Canton Ram Feed Stokers, #LSU-8. Cont. burning 540-600 # coal, 2 hr. peak, 700 # Fan-clarage, #4655a. Size 1¼ Motor, 3 HP., 1150 RPM, 208V, 60 Cy.
Steam coils, Vento, 5 sections 3' wide, 5' high, 24 fiberglass filters. Will take care of approx. 15,000 sq. ft. of radiation.
Boilers in A-1 condition, used about 1 year.
Stokers in A-1 condition, used about 6 months.
Motors rebuilt.
Equipment F.O.B. Waterloo, N. Y.
For further information call or write to
PINE TRUCKING CO.
P. O. Box 264 at Waterloo, N.Y., Phone 487

FOR SALE

16,000 Feet of 6" Steel invasion pipe with flexible couplings. Ideal for irrigation, drainage and rice field use. Easily installed and removed. Pipe tested for 1,000 P.S.I.

Also one 4-inch ball bearing pump powered by UD 6 International Diesel Engine all mounted on two-wheel rubber-tired trailer. Unit used only 45 days.

Hot Springs Municipal Water System
P. O. Box 576
Hot Springs, Arkansas

FOR SALE
4—Used Super "C" Tournapulls. Excellent Condition.
1—Used Bucyrus-Erie Model 22-B, Crane Dragline.
1—Used Link-Belt Model LS-85, Crane-Dragline.
1—Used Chicago Pneumatic 315-cubic foot portable Air Compressor.
Used Motor Graders, all sizes and makes
FEHRS TRACTOR & EQUIPMENT CO.
1809-11 Cuming Street
OMAHA 2, NEBRASKA
Phone—Atlantic—3127-28

FOR SALE
50 Composite type gondola cars standard gauge, 50 ton, 1771 cu. ft., length 41'6", height 4'8", cast steel side frames and bolsters, inter change condition. Attractively Priced.
Commercial Metals Co., St. Louis, Mo.
1714 Arcade Bldg.
CEntral 4457-8 LD99

FOR SALE or RENT
200 REX DOUBLE PUMPCRETE
GASOLINE ENGINE DRIVEN
WITH 600-FT. PIPE AND FITTINGS
WESTERN CONTRACTORS SUPPLY CO.
3145 W. Lake Street
Van 6-6363 Chicago, Ill.

USED TRACTORS

Allis-Chalmers HD-14 wide gauge Diesel Crawler Tractor, 22" shoes. Newly painted. Price F.O.B. Louisville, Kentucky $5,000.00

IHC TD-9 Diesel 60" wide gauge Crawler Tractor, 16" shoes, starter, crankcase guard, front pull hook, front bumper and radiator guard, muffler, precleaner, high seat, front idler shields and cutaway sprockets. Price F.O.B. Evansville, Indiana $8,500.00

IHC TD-18 wide gauge, 74" Diesel Crawler Tractor, with Bucyrus-Erie Cable operated angle dozer, 12' 2" blade and Model P-24 double drum power control unit. Price F.O.B. Louisville, Ky. $4,500.00

Caterpillar Model RD-6 wide gauge Diesel Crawler Tractor with cable operated Caterpillar straight type dozer blade 9' wide; and LeTourneau single drum power control unit. Price F.O.B. Louisville, Kentucky $4,000.00

Brandeis Machinery & Supply Co., Inc.
Louisville 8, Kentucky Evansville, Ind.

Bulldozer Blades for Sale
One or more at $300 each
New Army Surplus cable-operated bulldozer blades for Caterpillar Model D-7s, complete with front A frame with built-in radiator guard, trunion mounts and all necessary parts to put on a bare tractor.
Also used D-8 Hydraulic Angledozer complete $500.
G. T. ERICKSON
P.O. BOX 1017 Danbury, Conn.
Tel: Danbury, Conn. 2344 or 3240

Do You
Want to Sell or Buy Used Equipment?
Need experienced help?
Have a position open?
Send your copy to *The Trading Post* Contractors & Engineers Monthly, 470 Fourth Ave., New York 16, N.Y.

"BARGAINS"
NEW HUBER ROLLERS
15% off List Price
1—5-Ton 3-wheel with hyd. steering, canopy top, lights.
1—¾-Ton Tandem, electric starter.
OFFERED SUBJECT TO PRIOR SALE
GUARANTEED TO BE FACTORY NEW
ENSMINGER & COMPANY
57 Wood Street Wilkes-Barre, Penna.

WANTED
SHOVEL AND BACKHOE ATTACHMENTS
for Insley K12, P&H 255A and Link-Belt LS 85. General #40 ¾ cu. yd.
WENZEL MACHINERY COMPANY
2136 Jefferson St. Kansas City, Mo.

BUYING USED EQUIPMENT?
Read the **"TRADING POST"**
SELLING USED EQUIPMENT?
Advertise it in the **"TRADING POST"**

FOR SALE
NEW CHOKER SLINGS
WIRE ROPE—LOOPS SPLICED AT BOTH ENDS
Most Slings Made by ROEBLING—Made 1946 and later—Made of PLOW STEEL
(8" Loop Both Ends—6x19 & 8x19 (five or six strands of nineteen wires))
WHILE THEY LAST

Item	Specifications	Size	Approx. Wire. Price if Ordered in Quantities of	OUR Price on
1	Bare	½"x12'	$12.65	$ 8.50
2	Bare	½"x20'**	19.15	8.50
3	*Marline	⅝"x 8'	16.01	5.00
4	*Marline	⅝"x10'	18.10	5.25
5	*Marline	⅝"x15'	20.00	5.50
6	*Marline	⅝"x18'	21.00	5.75
7	*Marline	⅝"x20'	21.90	6.00
8	*Marline	⅝"x16'	22.30	5.50
9	Bare	1"x10'	25.95	10.00
10	Bare	1"x20'***	13.20	9.95
11	*Marline	1"x18'	33.50	7.00
12	Bare	1"x18'	39.10	12.00
13	*Marline	1"x20'	39.95	8.00
14	*Marline	1¼"x20'	39.95	8.00
15	Bare	1¼"x18'	40.90	13.00
16	*Marline	1¼"x18'	40.90	8.50

*8x19
** (Specify 9" or 18" loops)
*** Endless loops (20' circum.)
The above prices are Delivered Prices. If not rated Dun & Bradstreet send check with order.
Dept. C
NATIONAL MACHINE TOOL & SUPPLY CO.
13 No. 1st Street, Minneapolis, Minn.

Index to New Products And Catalogs

Described in this issue

CARE, the non-profit agency which has brought food to thousands of hungry people overseas, is now embarked on a "food for the mind" program to help rebuild the war-wrecked libraries of Europe and Asia.

Contributions of money to this worthy cause may be sent to CARE, 20 Broad St., New York 5, N. Y.

TRADING POST

CLASSIFIED ADVERTISING RATES

When less than 50 inches is used during one year the rate is $8.00 per inch. When 50 inches or more are used during one year the rate is $7.00 per inch. An advertising inch is measured ⅞-inch vertically on one column. Space reservations close in the New York office on the 18th of the month preceding publication. Send your classified copy to:

The Trading Post, Contractors & Engineers Monthly
470 Fourth Avenue, New York 16, N.Y.

FOR SALE

1—Marion Electric Shovel, 8-10 yd.
1—1600 h.p. diesel engine
3—1000 c.y. dump scows
1—Clamshell dredge, 8-10 yd.
2—Steel barges

MARINER CONSTRUCTION CO.
7530 N. Sheridan Rd.
Chicago, Ill.

A REAL BUY!

1—P&H ¾ cubic yard model 350 crane with 40′ boom, rebuilt, only $7500

1—Foote paver less boom and bucket, 10% overload drum $1800

CASEY & EMMERT, INC.
1424 W. Ohio Street
Chicago 22, Ill. Haymarket 1-6464

WANTED STEEL SHEET PILING

Box 316
Contractors and Engineers Monthly
470 Fourth Ave. New York 16, N.Y.

For Sale

1—IOWA MANUFACTURING COMPANY'S CEDARAPIDS UNITIZED STONE CRUSHING PLANT—

Practically new

Write for complete specifications:—

New York Trap Rock Corp.
230 Park Ave. New York 17, N. Y.

CONSTRUCTION EQUIPMENT BARGAINS!

1—Allis-Chalmers Model M, Serial ±11682 gasoline engine driven crawler tractor, with electric starter, as is where is.

1—Allis-Chalmers Model "WM" tractor, Serial ±10091, long track rigid frame with Hough 1½-yd. front end loader and bulldozer blade. In operating condition.

1—Allis-Chalmers Model "WM" gasoline burning crawler tractor, Serial ±11728 complete with 16" cut out shoes, electric starter and lights and Baker Model 2084 hyd. Bulldozer and two wheel pneumatic tired trailer—in perfect condition.

1—International Harvestor Model T6, Serial ±18K 2068 gasoline engine driven crawler tractor with electric starter, Motor ±T6KH-804, as is where is.

1—Allis-Chalmers Model "WK" gasoline tractor, Serial ±8388 with 18" shoes, electric starter, radiator guard, crankcase guard, and Gar Wood Model RSDX Hyd. Bulldozer, Ser. ±5757. In good operating condition.

1—Allis-Chalmers Model "WK" gasoline tractor, Serial ±4899 complete with Baker Hydraulic model 206 double action bulldozer, Serial ±987. RESUILT in perfect operating condition.

1—Allis-Chalmers Model "WK" gasoline tractor, Serial ±8480 complete with Gar Wood Model RSDX hyd. bulldozer, Serial ±3841 with dual valve rear mtd. hyd. system. RESUILT in perfect operating condition.

1—Allis-Chalmers Model HD7W Diesel tractor, Serial ±12310 complete with Gar Wood Model RSDX Hyd. bulldozer, Serial ±20832, front pump operated RE-BUILT.

1—Allis-Chalmers Model HD7W diesel tractor, Serial ±9702 complete with large idlers and long track and equipped with Gar Wood Model RSCX hyd. dozecaster, front pump operated, and Gar Wood Model 2S, 2-wheel hyd. scraper, Serial ±21435, with rear mounted hyd. system. RESUILT. In perfect operating condition.

1—Allis-Chalmers Model HD10W Diesel tractor, Serial ±3440 complete with Baker Model 437A Hyd. Bulldozer, Serial ±128, front pump operated. RESUILT and guaranteed.

1—Allis-Chalmers Model 110 Pull type Blade grader, Serial ±1-A-79. Mounted on 7.00 x 20 pneumatic tires. RESUILT. In perfect operating condition.

1—American Model 350 1½ yd. Crawler mounted combination Shovel and Clamshell, Serial ±6-353, powered by Waukesha CH512S gasoline engine, Serial ±406317, with choice of new fair lead or dirt drag bucket or new clam bucket. RESUILT THROUGHOUT. In good operating condition.

1—American Crawler mounted 1-yd. Serial ±CS-155, combination dragline shovel and back hoe. Gasoline engine driven, all complete. In perfect operating condition.

1—Worthington 105-ft. portable air compressor, gasoline engine driven, on a 2 pneumatic tired wheel. In perfect operating condition.

1—Worthington 60 ft. portable air compressor gasoline engine driven. In perfect operating condition.

1—Buckeye No. 12 Trencher S/N 12-50 with Buda 326-hp. engine. This machine is two years old.

1—Buckeye Model 312 Trencher—equipped with GM Diesel engine. This machine will cut ditch 33" wide, 5½′ deep. 7 months old.

1—Cleveland Model 140-A Trencher S/N 5292 with Buda 326-hp. engine. Machine will cut 30" wide and 5½′ deep. Machine is 7 months old.

Write, phone or wire

LAKESHORE MACHINERY & SUPPLY CO.
400 West Laketon Ave.
Muskegon, Michigan
Phone: 2-6655

IMMEDIATE DELIVERY

1—Used Allis-Chalmers HD10W with Gar Wood hydraulic bulldozer. Rebuilt.

1—Slightly used 1949 Mack Model E.H. T, demonstrator. Very good discount. Equipped with Tulsa winch, less fifth wheel.

1—Rebuilt HD14C with double drum Gar Wood CCU & Buckeye cable angle dozer.

1—Used Case tractor with Lull loader.

1—Rebuilt Model HD10W tractor w/Baker bulldozer.

1—Slightly used FWD Model HG w/ Heil dump body, $5,000.00.

1—1947 White 20 truck w/ grain semi-trailer.

New Portable Conveyor 24"x30" on 2 6:00x 16 pneumatic tires and 7½ H.P. air-cooled motor.

New winch-lift trailers—12 and 20 cu. yd. capacity.

1—12′ Adams grader.

1—M & M Model UT1 tractor w/ dual tires.

1—New Moorhead portable sand drier —$1325.00.

1—Used Buckeye Model 70 dragline and shovel.

1—Used Allis-Chalmers Model E-60 power unit.

2—C.I.C. drag conveyors.

1—Novo traffic line marker.

1—New Novo standard pavement breaker.

1—Used Carco towing winch for Model HD14 tractor.

1—Portable Repair Shop equipped w/ Arc Welder, Air Compressor, 3 KW generator, front-mounted winch w/ 10′ portable boom, pipe vise, 4 retractable drop cords, 2 built-in work benches, completely enclosed van type body in which there is a gasoline heater for working in cold weather. Sides of the van open up which provides a work bench extending along both sides and rear of van. Entire unit mounted on General Motors 6x6 truck which has been driven less than 3000 miles.

ILLINOIS ROAD EQUIPMENT CO.
1310 E. Jefferson St.,
Springfield, Ill.
Phone 2-7709

RUGGED HAULING JOB???

Did you say your transportation was impossible, too costly or just plain tough? Before you throw up your hands, call U.S.A.C. headquarters and let us check it over for you. If we don't handle it to your entire satisfaction, the best box of cigars in the house is on

U.S.A.C. TRANSPORT, INC.
DOVER, DELAWARE Phone 5701

NEW PARTS for

P.&H. and Northwest Shovels, LaPlant-Choate & LeTourneau Scrapers, Ingersoll-Rand & C.-P. Compressors, Huber Rollers, Kohler & Onan Generators, LeRoi, Waukesha, Hercules, Chrysler, Wisconsin, Climax Engines, Ransome, Allis-Chalmers, Domestic Pump, Cleaver Brooks, Canton Shears & others.

NORTH JERSEY EQUIPMENT CO.
343 Elizabeth Ave. Newark 8, N.J.
Bigelow 2-2323

CONCRETE COLORS
No. 14 Yellow No. 75T25F Rust
"Fine Because of Their Fineness"
for
CONCRETE HIGHWAY MARKING
Ask for information and samples
BLUE RIDGE TALC CO., Inc.
Henry, Virginia

FOR SALE

50,000 Gallon steel water tank, mounted on 90 foot (4-legged) steel tower, with 20 H.P. Electric motor-driving Byron-Jackson deep well pump 200 ft. This equipment is furnished with steam coils in tank and around life pipe. Located in Siskiyou County.

Write or contact
ERNEST BANKS
Alturas, California

"Safety King" Wire Rope Slings

Choker, Bridle and Basket Slings
Wire Rope Distributors for
American Steel and Wire Company
LOWERY BROTHERS
95th and Ewing Chicago, Ill.

1—Mancha Little Trammer, 20" gage, overhauled and guaranteed
2—Brand new Batteries for above
1—Hertner Battery Charger, guaranteed

OTTO P. SEEFELD
5101 W. State Street Milwaukee 8, Wisc.
Tel. Blue Mound—8-4710

FOR SALE

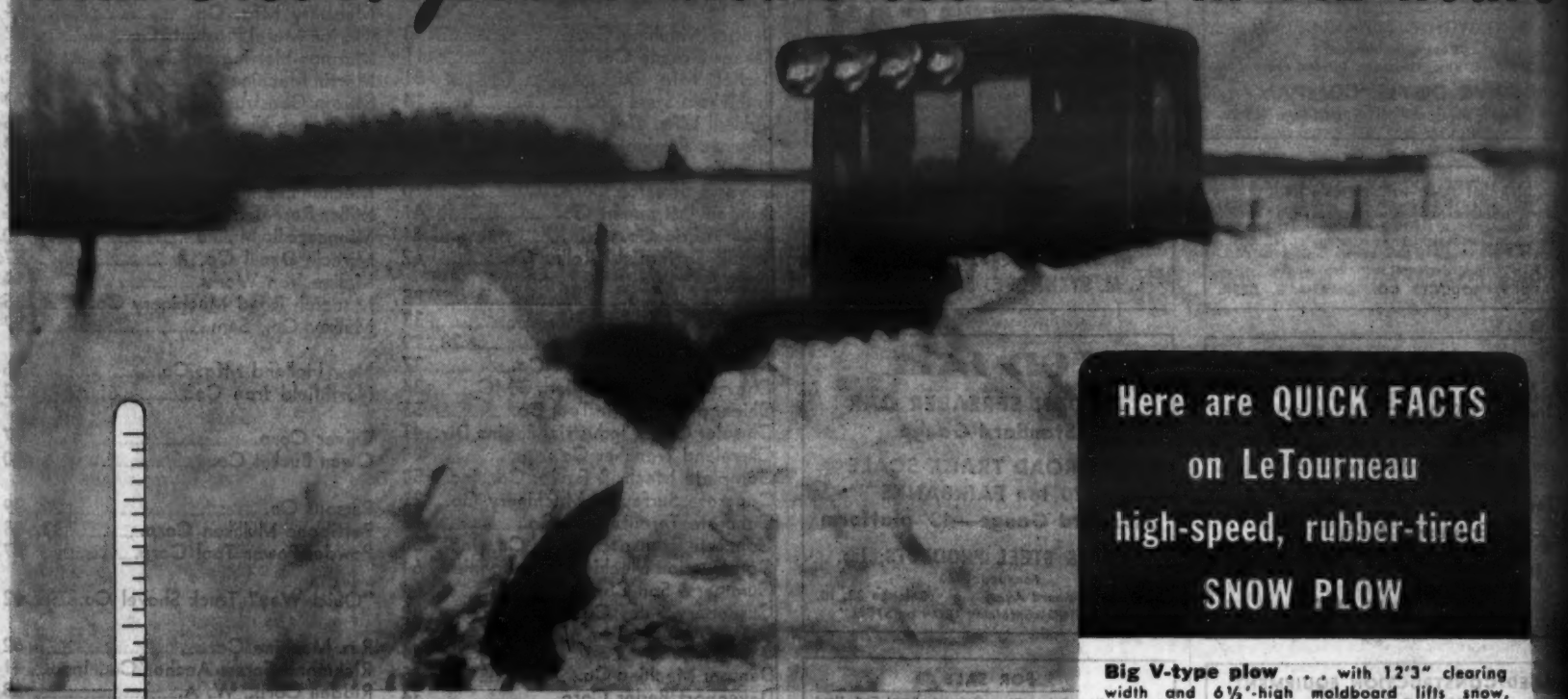
1. 1—Double Drum LeTourneau Sheepsfoot Roller. Used less than thirty days..... $ 1,000.00
2. 1—Ord-Blaw-Knox finishing machine, double screed, set up for 12′ road, completely overhauled, nice machine..$ 1,000.00
3. 1—Barnes road pump. Heavy duty; good for Concrete Work..... $ 500.00
4. 1—Tournapull rubber-tired machine used six months; 18-c.y. capacity, with Cummins Diesel Motor. Almost new..$ 9,000.00
5. 1—LeTourneau 15-yd. pan, tires 18"x34". New 1946..... $ 4,000.00
6. 1—HD-10 Allis-Chalmers Tractor with Baker Hydraulic bulldozer 10′ blade. 1946 model..... $ 8,000.00
7. 1—412 Adams Road Grader, late model 1946, pneumatic tires. Rear 1300x 24. Front 700x24. International Diesel Motor ..... $ 4,500.00
8. 1—HD-14 Allis-Chalmers Bulldozer Double Drum Power take-off. 10′ Hydraulic Baker Blade. Good for pan and bulldozing work..... $ 9,000.00
9. 1—Jaegar Air Compressor on Pneumatic Tires. 105 cu. ft. with two paving breaking hammers ..... $ 2,000.00
10. 1—Ten-ton, 3-wheel Hercules Roller, 4-cylinder motor. Electric starter..... $ 2,500.00
11. 1—Heavy-duty Osgood Combination Crane & Shovel equipped with 45-ft. boom, 1-yd. Blaw-Knox bucket also equipped with shovel front and dipper stick. Has new 90 hp GM diesel motor..... $12,000.00
12. 1—No. 66 Caterpillar Pull Grader 12′ blade, leaning wheels..... $ 750.00
13. 1—Lot of Blaw-Knox combination curb and gutter forms also 1,000 feet of 5″ sidewalk forms (the lot)..... $ 1,000.00
14. 1—Gar Wood 15-yd. Pan. Purchased new March, 1948..... $ 5,000.00
15. 1—45′ Lattice Boom, Osgood..... $ 500.00
16. 3—One-yd. Blaw-Knox Buckets..... ea. $ 500.00
17. 1—Lot of pile driving rig, including 3,000-lb. hammer, cap and leads (for the lot)..... $ 600.00
18. 1—Three-bag Ransome Mixer on four pneumatic tires, with scales and three pneumatic Tired Concrete Carts..... $ 1,500.00

WALLER PAVING COMPANY
Salisbury, Maryland
Phone 1166

MINIATURE
DUST MASK
Keeps dust out of nose. Handy as pair of glasses. 9 sq. in. filter. Weighs only 1 oz. Order Today!
Only $1.00 p.p.
Jerry Bryant Products—Dept. 3
919 N. Michigan Ave., Chicago 11, Ill.

Index to Advertisers

New TOURNADOZER with *snow plow* clears 600 miles in 142 hours



34° below zero...drifts 3 to 8 feet deep

When deep drifts snowed-in Hamiota, Manitoba, Canada last winter, the Rural Municipality of Hamiota brought in a 19 m.p.h. Super C Tournadozer to clear roads and open farm lanes. Here's the performance report from E. J. Potts, Municipality foreman . . . "I plowed through packed roads 3½' deep and snow banks up to 5 to 8 feet at a steady rate of 6 miles per hour . . . covered 360 miles of roads in 96 engine hours . . . I am *highly* satisfied!" Plowing a 250-yard farm lane, Tournadozer made two passes . . . 1 to clear, 1 to widen . . . cleared roadway through snow 4 to 6' deep, in only 5 minutes! Working throughout the winter in temperatures often as low as 34° below zero, Tournadozer plowed over 600 miles in 142 hours of operation . . . breaking through sleigh-packed drifts, some almost solid ice . . . cleared every road and farm lane in the Hamiota area.

Every month is a working month with TOURNADOZER

With rugged LeTourneau snow plow, and interchangeable dozer blade, electric-controlled Super C Tournadozer is a profitable year-around rig. Gives you an efficient snow plow during winter months and a high-speed dirt-moving bulldozer during rest of year. Any way you look at it, this high-speed, rubber-tired Tournadozer is the best year-around dozer money can buy . . . a sound investment because it does all kinds of jobs all year round. It's fast . . . efficient . . . easy to operate . . . outperforms old-style crawler dozers two and three-to-one! Check its fast, profitable performance now. Write or call your nearest LeTourneau Distributor TODAY for all the facts on how powerful Tournadozer can earn money for you.

Busting drifts at high-speed, Contractor Frank Halverson's Tournadozer cleared 450 miles of roads in 10 days, near Bonesteel, S.D., during "Operation Snowbound"

Here are QUICK FACTS on LeTourneau high-speed, rubber-tired SNOW PLOW

Big V-type plow . . . with 12'3" clearing width and 6½'-high moldboard lifts snow, quickly . . . flows it high off ends of "plow-share" blade well over the ditch line.

Vertical divider plate, in center of Tournadozer's big V-blade, eliminates plowing snow back onto the road when widening.

Adjustable shoes . . . 3 easily-adjustable runner shoes "nose up" or "nose down" plow for peeling off snow and ice without damage to road surface or plow.

19 m.p.h., drift-busting speeds . . . plus same 4 speeds in reverse . . . speed clearing on both patrolling, and on shuttle operation. Instant "no-shift" gear selection means faster operation through use of higher gear ratios.

180 h.p. diesel . . . 32,200 lbs. of weight behind heavy-duty plow . . . plus short 5'11⅝" wheelbase and 4-wheel drive on giant 21.00 x 25 low-pressure tires let you use top speeds even in heaviest plowing.

No side-skid, away from bank . . . close-coupled Tournadozer fits snugly up forward into deep V-section of plow . . . gives powerful, straight-line forward drive.

Full operator visibility . . . engine in rear puts operator up front where he can see where he's going . . . what he's doing . . . especially in close-quarter street work. No neck-stretching. All-weather cab optional.

Easy electric control . . . smooth, fast-acting, gives accurate control of blade, reduces operator fatigue . . . helps get more work done.

Quickly interchangeable . . . operator changes from plow to regular dozer blade in only an hour — and your Tournadozer's ready to handle dirtmoving work. Tournadozer makes fast, self-powered moves anywhere on or off highway, with dozer blade or plow.

Engineered by Tournadozer—Trademark Reg. U.S. Pat. Off.

LETOURNEAU HIGH-SPEED RUBBER-TIRED TOURNADOZERS

PEORIA, ILLINOIS

IT'S RUBBER THAT PUTS THE ACTION IN TRACTION